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MASTERS OF THE LAND: *Native Ship and Canal Building During the Spanish-Aztec War*

ABSTRACT: In 1520, during the midst of the conquest of Mexico, Spanish conquistadors and their Native allies embarked on a massive naval project—the construction of 13 brigantines and a canal—needed to help conquer the aquatic city of Tenochtitlan. In the dominant historical literature on the war, the Spanish tend to receive most, if not all, of the credit for the success of the nautical program. The contributions of their Native allies by contrast are little-known and oft-overlooked in the historiography. Drawing on Spanish and Indigenous sources, this article highlights the vital roles that Native peoples played in the naval episode, whether it be felling timbers, carving wood, transporting logs, or excavating the canal. In addition to labor services, it also considers the importance of Indigenous ecological and hydrological expertise, and demonstrates how such knowledge played a pivotal role in the overall success of the enterprise. I argue, ultimately, that these contributions made the Native peoples, and not the Spanish, the true masters of the amphibious operation. Along the way, this essay seeks to contribute to several important strands of scholarship, chiefly the New Conquest History, environmental histories of New Spain, and the burgeoning literature on Indigenous knowledge production in Spanish America.

KEYWORDS: Spanish-Aztec War, Native allies, brigantines, canal, New Conquest History

In February 1521, a massive caravan of some 30,000 Native people assembled in the province of Tlaxcala for an important mission.[1] Under

This article grew out of a paper presented at the 2022 annual meeting of the American Society of Ethnohistory in Lawrence, Kansas. It formed part of the panel titled "(K)new Conquest Histories: Continuities of Indigenous Ecological Knowledge During and After the Invasions of Mesoamerica," which also included presentations from Scott Doebler and Megan McDonie. I would like to express my sincerest thanks to Dana Velasco Murillo, Barbara E. Mundy, and David Orique, who read various drafts of this piece and provided invaluable feedback. I extend this gratitude to John F. Schwaller, Stephanie Wood, and Robert Haskett for their insightful comments and suggestions. A special thanks to the two anonymous readers assigned by *The Americas* to this paper; their close reading helped me much improve it from its earlier forms. Finally, I must acknowledge the research funding and support that I received from the Fulbright-Hays (DDRA) Fellowship, as well as the History Department at the University of California, San Diego.

1. Interrogatory and Testimony, 1565, Archivo General de Indias [hereafter AGI], Patronato 74, N.1, R.13. One of the questions in the *interrogatorio* (questionnaire) asks whether there were 30,000 Native peoples present: "[si] *por todos heran mas de treynta mill*." One witness, Martín López, asserted that there were "many more people than the question says" ("*fue mucha gente mas de lo que la pregunta dize*"), which would have been over 30,000 Indigenous people. A second witness, Francisco Rodríguez, noted that there were upward of 20,000 Native people present ("*le parecio a este testigo que vennian ocupados en esto mas de veinte mill yndios*"). The writings of the conquistadors and later chroniclers largely agree on these figures. See Hernando Cortés, *Hernán Cortés: Letters from Mexico*, J. H. Elliot and Anthony Pagden, eds. (New Haven: Yale University Press, [1971] 2001), 185; Francisco Cervantes de Salazar, *Crónica de la Nueva España* (Madrid: Hispanic Society of América, 1914), Book 5, chapt. 69; and Fernando de Alva Cortés Ixtlilxochitl, *The Native Conquistador: Alva Ixtlilxochitl's Account of the Conquest of New Spain*, Amber Brian, Bradley Benton, and

orders from Hernando Cortés, the Spanish military leader, the convoy was to transport a shipment of precious cargo to the lakeshore *altepetl* (city-state) of Tetzcoco, over 60 miles to the northwest. To safeguard the caravan and ensure the prized merchandise reached its intended destination, 20,000 Native warriors accompanied the immense column as it marched through the lands of various enemies. What precious materials lay inside the shipment, one might wonder, to require so large a retinue of forces? Interestingly, the cargo contained neither harquebuses nor crossbows, nor cannons nor gunpowder, but neatly bound timbers, intended for the construction of a fleet of brigantines. Once assembled, the prefabricated navy would be one of the keys to winning the war against Tenochtitlan, a multiethnic confederation of Indigenous polities, whose strategic location in the center of a lake buttressed its strong/formidable defenses (see Figure 1).

For four days, the caravan marched across forests and mountains until it reached Tetzcoco in late February.[2] Once the timbers arrived at the shipyard, Indigenous assistants hurriedly went to work, carrying logs, assembling planks, and fastening the masts of the ships. But there was a problem. To launch the landlocked crafts into the lake, a canal would be needed to float the vessels from the construction site into Lake Texcoco. For roughly seven weeks, 40,000 Native people labored on the excavation of an enormous ditch, 12 feet wide and equally deep, and extending an astonishing 9,100 feet to the lakeshore.[3] The artificial waterway was complete by the spring of 1521, and with this feat, the warships were ready for deployment.

Although the impact of the brigantines in the final siege of Tenochtitlan has figured prominently in histories of the Spanish-Aztec War (1591-21), little attention has been paid to the actual construction of the vessels or the canal that was needed to launch them into Lake Texcoco.[4] This is rather surprising,

Pablo García Loaeza, eds. and trans., Latin American Originals 10 (University Park: Pennsylvania State University Press, 2015), 31. For a transcription of the 1565 interrogatory, see "Información recibida en México y Puebla el año de 1565, a solicitud del gobernador y cabildo de naturales de Tlaxcala, sobre los servicios que prestarón los Tlaxcaltecas a Hernan Cortés en la conquista de México, siendo los testigos algunos de los mismos conquistadores," Anselmo de la Portilla, ed. (Mexico City: Imprenta de Ignacio Escalante, 1875).

2. Cortés, *Letters from Mexico*, 186; Bernal Díaz del Castillo, *Discovery and Conquest of Mexico*, A. P. Maudslay, trans., Hugh Thomas, intro., 2nd ed (Cambridge, MA: Da Capo Press, 2003), 353.

3. For the dimensions of the canal, see Cortés, *Letters from Mexico*, 206; Alva Ixtlilxochitl, *Native Conquistador*, 36; and Cervantes de Salazar, *Crónica*, Book 5, chapt. 104. Cervantes de Salazar and Alva Ixtlilxochitl both claim 400,000 Native people worked on the canal, though modern historians tend to believe this was an inflated figure. Cervantes de Salazar, *Crónica*, Book 5, chapt. 104; Alva Ixtlilxochitl, *Native Conquistador*, 36; C. Harvey Gardiner, *Naval Power in the Conquest of Mexico* [1956], reprint ed. (Austin: University of Texas Press, 2012), 125; and Ross Hassig, *Mexico and the Spanish Conquest* [1994], 2nd ed. (Norman: University of Oklahoma Press, 2006), 147.

4. On the impact of the ships, see for instance William H. Prescott, *History of the Conquest of Mexico* [1843], James Lockhart, intro. (New York: Modern Library, 2001), Book 6, chapt. 5, 741–761; Gardiner, *Naval Power*, 196–200; and Hassig, *Mexico and the Spanish Conquest*, 158–161.

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FIGURE 1
The 1524 Nuremberg Map of Tenochtitlan

Source: Newberry Library, Chicago, Edward E. Ayer Digital Collection. The woodcut map, the first image of Tenochtitlan seen in Europe, was published alongside copies of Hernando Cortés's letters to Holy Roman Emperor Charles V (King Charles I of Spain). In colorful detail, it displays some of the city's finest architectural and engineering achievements, including its royal palaces, temples, houses, causeways, canals, and man-made dikes.

considering that the eight-month naval program was one of the most remarkable achievements of the entire war.[5] Just to construct the crafts, the wood for the ships first needed to be cut and trimmed in the forests of Tlaxcala, transported some 60 miles overland to Tetzcoco, and finally assembled at the improvised shipyard near the lakeshore.[6] The great Italian humanist, Peter Martyr d'Anghiera (chaplain to the court of King Ferdinand and Queen Isabella), did not fail to marvel at the herculean effort, opining that "even the Romans, when their prosperity was at its height, would not have found this undertaking easy."[7] And yet, the second stage of the naval project—the construction of a canal of nearly one and

5. Gardiner estimates that the project took approximately eight months to complete, roughly from September 1520 to April 1521. *Naval Power*, 128.

6. Cortés, *Letters from Mexico*, 185. In sixteenth-century New Spain, the *legua común* (common league) equaled four Castilian miles, the equivalent of roughly 5.57 kilometers, or 3.46 miles. Roland Chardon, "The Elusive Spanish League: A Problem of Measurement in Sixteenth-Century New Spain," *Hispanic American Historical Review* 60:2 (May 1, 1980): 294–302.

7. Peter Martyr d'Anghiera, *De orbe novo: The Eight Decades of Peter Martyr d'Anghera*, Francis Augustus MacNutt, trans., 2 vols. (New York: G. P. Putnam's Sons, 1912), vol. 2, The Fifth Decade, 172.

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three-quarter miles long—arguably supersedes it. If we consider the sheer immensity of the labor force (40,000 workers), the length of the canal, and the expeditious nature in which its construction was accomplished (50 days), this must be recognized as one of the most impressive engineering feats attempted in the early modern world.[8] Nonetheless, relatively little has been written about the nautical program in the historiography of the Spanish-Aztec War. Most notably omitted is the role of the Native peoples who constituted its backbone.

One reason for the paucity of scholarship on the naval episode is that the earliest sources on the conquest, principally the written accounts of the invaders, do not pay great heed to it. The two main conquistador-authors, Hernando Cortés and Bernal Díaz del Castillo, were off in other provinces during much of the enterprise, and do not provide extensive details on the effort.[9] Native accounts of the project are difficult to come across, and those that reference the canal and ship-building are typically paltry in detail.[10] With relatively meager documentation, the naval story—and particularly the construction of the canal—was glossed over in subsequent histories of the conquest, and remained largely undiscovered for the better part of four centuries.

It was not until the mid twentieth century that the US historian C. Harvey Gardiner issued a detailed account of the project, one of the first, which was derived in good measure from archival documents left by the master shipwright, Martín López.[11] Drawing on the testimonies of López and members of his brigantine team, Gardiner was able to uncover many aspects of

8. One of the few projects to supersede it in scale was the Desagüe de Huehuetoca, the enormous hydraulic scheme intended to drain the flood-prone lakes that surrounded the City of Mexico. For scholarship on this project, see W. M. Mathes, "To Save a City: The Desagüe of Mexico-Huehuetoca, 1607," *The Americas* 26:4 (1970): 419–438; Vera S. Candiani, *Dreaming of Dry Land: Environmental Transformation in Colonial Mexico City* (Stanford: Stanford University Press, 2014); and Matthew Vitz, *A City on a Lake* (Durham: Duke University Press, 2018).

9. Cortés, *Letters from Mexico*; Díaz del Castillo, *Discovery and Conquest*; Francisco López de Gómara, *Cortés: The Life of the Conqueror by His Secretary*, Lesley Byrd Simpson, trans. (Berkeley: University of California Press, 1964). Cortés was present only intermittently for the construction of the brigantines, being largely tied up in diplomatic excursions or various mop-up campaigns in preparation for the final siege.

10. Alva Ixtlilxochitl, *Native Conquistador*; Bernardino de Sahagún, "Book Twelve of the Florentine Codex," in James Lockhart, *We People Here: Nahuatl Accounts of the Conquest of Mexico* (Eugene, OR: Wipf & Stock Pub, 2004), 48–255; Chimalpahin Quauhtlehuanitzin, *Chimalpahin's Conquest: A Nahua Historian's Rewriting of Francisco López de Gómara's La Conquista de Mexico*, Susan Schroeder, David Tavárez, Anne J. Cruz, and Cristian de la Carrera, eds. (Stanford: Stanford University Press, 2010).

11. Gardiner, *Naval Power*. The AGI in Seville houses a number of rich documents pertaining to the career of Martín López and his involvement in the shipbuilding enterprise. Chief among them are two interrogatories and their accompanying testimonies, from 1528 and 1534, and a statement of merits and services produced by López in 1560. The two interrogatories were brought together in 1547, at the request of Martín López in 1544, and are housed in the AGI under the same classification, Patronato 57, R. 1, N.1. The 1560 statement, which also contains the related testimony of seven witnesses, falls under the following classification: AGI, Patronato 63, R. 15. Notably, these materials have been transcribed and translated into English (referred to as "the Conway Collection"), with copies located at the University of Aberdeen and Cambridge University. For additional archival documentation pertaining to López, see Gardiner, *Martín López: Conquistador Citizen of Mexico* (Lexington: University of Kentucky Press, 1958), 181–183.

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the shipbuilding episode that were previously overlooked. While Gardiner's work is noteworthy as a first attempt to reconstruct the shipbuilding program, his account suffered from a key methodological flaw—it relied almost exclusively on Spanish sources. He thus presents an essentially one-sided view of the enterprise, in which Martín López and his team of Castilian shipbuilders are heralded as its heroes and chief executors.[12] Since Gardiner wrote, one might expect that historians would have investigated the role of Native peoples in the project, but this has not been the case.[13] To date, few scholars have revisited the naval enterprise, and none, to my knowledge, have explored the extensive involvement of the Indigenous peoples in it. The present study seeks to fill this gap. Though it has long been accepted that the Spanish were the main drivers of the naval project, this article argues that its success is owed primarily to the collective efforts of their Native allies, whose ecological expertise, labor services, and hydrological knowledge made them the true masters of the amphibious operation.[14]

By placing Native peoples front and center in the naval story, this article situates itself within the robust literature broadly characterized as New Conquest History (NCH).[15] The NCH is a markedly revisionist school of scholarship that emerged in part as a challenge to the "great-man" histories of the conquest of the Americas, which for centuries centered on the heroics of conquistadors such as Cortés or Francisco Pizarro and aggrandized their role in the toppling of mighty empires.[16] Over the past several decades, NCH scholars have sought to complicate and replace those celebratory narratives by investigating the lives of participants traditionally ignored in conquest literature, such as Africans, women, ordinary Spaniards, and Native peoples.[17] Of the themes that have

12. Gardiner dedicated an entire book to Martín López in a later study, and similarly extolled the role of the master shipwright in the construction and transportation of the ships: "Their construction and original assembly represented a mammoth undertaking, and their transportation, timber by timber, over more than fifty miles of rolling and mountainous terrain was also a memorable part of the miracle engineered by Martín López." See *Martín López*, 42.

13. In many ways this article can be read as a companion piece to Gardiner's *Naval Power*, balancing our understanding of the nautical project by centering on the viewpoints of the Native peoples.

14. Seldom has the naval story been told, but when it is, the Spanish traditionally receive much of the credit for the success of the enterprise. William H. Prescott, for example, described the execution of the shipbuilding enterprise as the product of Cortés's personal ingenuity: "It was, indeed, a stupendous achievement, and not easily matched in ancient or modern story; one which only a genius like that of Cortés could have devised, or a daring spirit like his have so successfully executed." Prescott, *Conquest of Mexico*, 689. See also Gardiner, *Martín López*; Gardiner, *Naval Power*; and Ramón Cruces Carvajal, *Los bergantines de Hernán Cortés: el final de una obsesión* (Mexico City: Ediciones Alpe, 2006).

15. On the development of the New Conquest History, see Matthew Restall, "The New Conquest History," *History Compass* 10:2 (2012): 151–160.

16. See for instance William Robertson, *The Works of William Robertson: History of America*, 4 vols., Dugald Stewart ed. (London: Cadell and Davies, 1817); Prescott, *Conquest of Mexico*; Prescott, *History of the Conquest of Peru*, 2 vols. (New York: Harper & Brothers, 1847); and Hubert Howe Bancroft, *History of Mexico*, 6 vols. (San Francisco: Bancroft & Co., 1883–1888).

17. For a few representative studies, see Matthew Restall, "Black Conquistadors: Armed Africans in Early Spanish America," *The Americas* 57:2 (2000): 171–205; Stephanie Wood, *Transcending Conquest: Nahua Views of Spanish Colonial Mexico* (Norman: University of Oklahoma Press, 2003); Florine Asselbergs, *Conquered Conquistadors—The Lienzo de*

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emerged from the NCH, one of the more enlightening concerns the crucial ways that Indigenous allies helped to extend Spain's dominion in the Americas. For example, Camilla Townsend, in her study of Cortés's native interpreter, Marina (also known as Malintzin or La Malinche), illustrates how this liminal figure played a pivotal role in the Spanish-Aztec War as an esteemed translator, adviser, and strategist to Cortés. In a similar vein, Laura Matthew and Michel Oudijk edited an important volume on Indigenous auxiliaries that explored the different ways that Native allies (both combatants and non-combatants) contributed to Spanish conquest campaigns across Mesoamerica. This article seeks to further explore this aspect of the NCH, illuminating the pivotal contributions that diverse Indigenous collaborators—porters and artisans, guides and cooks, spies and scouts, translators and warriors—rendered to the lengthy naval project.

One of the most critical Native contributions to the project, aside from labor, came in the form of knowledge and expertise. For millennia, the Indigenous peoples who dwelled in the Basin of Mexico accumulated a dense store of knowledge on their milieu, learning not only how to adapt to the land, water, and ecosystems around them, but also modify them to their needs by constructing dams, aqueducts, bridges, sluice gates, and other impressive engineering projects.[18] When the naval program commenced in 1520, Native peoples would channel this hydrological and ecological wisdom into the amphibious enterprise, helping to steer its direction and ultimately ensure its success.

This assertion of the importance of Native expertise rests in stark contrast to traditional histories of knowledge production in the Atlantic World, in

Quauhquechollan: A Nahua Vision of the Conquest of Guatemala (Boulder: University Press of Colorado, 2004); Camilla Townsend, *Malintzin's Choices: An Indian Woman in the Conquest of Mexico* (Albuquerque: University of New Mexico Press, 2006); Laura Matthew and Michel R. Oudijk, eds., *Indian Conquistadors: Indigenous Allies in the Conquest of Mesoamerica* (Norman: University of Oklahoma Press, 2007); Ida Altman, *The War for Mexico's West: Indians and Spaniards in New Galicia, 1524–1550* (Albuquerque: University of New Mexico Press, 2010); Laura Matthew, *Memories of Conquest: Becoming Mexicano in Colonial Guatemala* (Chapel Hill: University of North Carolina Press, 2012); John F. Schwaller and Helen Nader, *The First Letter from New Spain: The Lost Petition of Cortés and His Company, June 20, 1519* (Austin: University of Texas Press, 2015); and Matthew Restall, *When Montezuma Met Cortés: The True Story of the Meeting that Changed History* (New York: Ecco, 2018).

18. For studies on the various forms of water control and management in the Valley of Mexico, see Ángel Palerm, *Obras hidráulicas prehispánicas en el sistema lacustre del Valle de México* (Mexico City: Instituto Nacional de Antropología e Historia, 1973); Teresa Rojas Rabiela, Rafael A. Strauss K., and José Lameiras, *Nuevas noticias sobre las obras hidráulicas prehispánicas y coloniales en el Valle de México* (Mexico City: Instituto Nacional de Antropología e Historia, 1974); Jeffrey R. Parsons, "The Role of Chinampa Agriculture in the Food Supply of Aztec Tenochtitlan," in *Cultural Change and Continuity: Essays in Honor of James Bennett Griffin,* Charles E. Cleland, ed. (New York: Academic Press, 1976): 233–257; Barbara E. Mundy, *The Death of Aztec Tenochtitlan, The Life of Mexico City* (Austin: University of Texas Press, 2015); and Richard M. Conway, *Islands in the Lake: Environment and Ethnohistory in Xochimilco, New Spain*, Cambridge Latin American Studies (New York: Cambridge University Press, 2021).

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which Indigenous epistemologies were discredited and cast aside as inferior or inconsequential. For a long time, Europeans were understood to be the bearers of scientific objectivity and modernity: knowledge flowed unidirectionally from European centers to non-European peripheries, and not vice versa.[19] Starting in the 1970s, a string of studies has contested these deeply-rooted assumptions, demonstrating that local Indigenous communities across Spanish America transmitted critical knowledge, and that Europeans frequently relied on Native expertise in questions of geography and other information essential to their extractive economies.[20] This article will contribute to the growing literature on Native knowledge production, emphasizing the importance of Indigenous epistemologies in applied and natural sciences, and ultimately demonstrating its pertinence to the success of the amphibious project.

The lengthy naval program required a considerable reserve of natural resources—timber, of course, to build the ships—but also cotton and pitch to caulk them, stone to fortify the walls of the canal, and nearby water sources to fill it. In the histories of the Spanish-Aztec War, the impact of the environment on the nature of the war in terms of logistics, planning, and execution is rarely discussed.[21] For the most part, scholars tend to privilege the importance of human agents or weapons (for example, horses or cannons) in shaping the direction and war strategies of the conquest, often forgetting that the environment, too, could alter war in significant ways.[22] For example,

19. George Basalla, "The Spread of Western Science: A Three-Stage Model Describes the Introduction of Modern Science into Any Non-European Nation," *Science* 156:3775 (1967): 611–622.

20. For recent works, see Matthew James Crawford, *The Andean Wonder Drug: Cinchona Bark and Imperial Science in the Spanish Atlantic, 1630–1800* (Pittsburgh: University of Pittsburgh Press, 2016); Alison Margaret Bigelow, Mining Language: Racial Thinking, Indigenous Knowledge, and Colonial Metallurgy in the Early Modern Iberian World (Chapel Hill: University of North Carolina Press, 2020); and Tatiana Seijas and Dana Velasco Murillo, eds., "A New Mining and Minting History for the Americas," *Colonial Latin American Review* 30:4, Special Issue (January 2022): 520–544. For an excellent study on this topic during the modern period, see Gabriela Soto Laveaga, *Jungle Laboratories: Mexican Peasants, National Projects, and the Making of the Pill* (Durham: Duke University Press, 2009).

21. Environmental histories of New Spain tend to focus on the period following the fall of Tenochtitlan, and typically emphasize themes of environmental degradation, or issues related to the conservation of regional resources. See Elinor Melville, *A Plague of Sheep: Environmental Consequences of the Conquest of Mexico* (Cambridge: Cambridge University Press, 1994); Lane Simonian, *Defending the Land of the Jaguar: A History of Conservation in Mexico* (Austin: University of Texas Press, 1995); Sonya Lipsett-Rivera, *To Defend Our Water with the Blood of Our Veins: The Struggle for Resources in Colonial Puebla* (Albuquerque: University of New Mexico Press, 1999); and Melville and Bradley Skopyk, "Disease, Ecology, and the Environment," in *Oxford History of Mexico* [2000], William H. Beezley and Michael C. Meyer, eds. (Oxford: Oxford University Press, 2010): 203–234.

22. For exceptions across Spanish America more broadly, see Noble David Cook, *Born to Die: Disease and New World Conquest, 1492–1650,* New Approaches to the Americas Series (Cambridge: Cambridge University Press, 1998); Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, CT: Greenwood Publishing Co., 1972); Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 2004); and Jared M. Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (New York: Norton, 1999). In the last several decades, Latin American scholars have increasingly treated environmental forces such as hurricanes, volcanoes, and mosquitoes as historical agents. See for example Louis A. Pérez, Jr., *Winds of Change: Hurricanes and the Transformation of Nineteenth-Century Cuba* (Chapel Hill: University of North Carolina Press, 2001); and J. R. McNeill, *Mosquito Empires: Ecology and War in the Greater Caribbean, 1620–1914* (Cambridge: Cambridge University Press, 2010).

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J. R. McNeill's *Mosquito Empires* illustrates rather compellingly how disease-transmitting mosquitoes for centuries shielded the West Indies from invaders, first thwarting Dutch, British, and French interlopers in the Spanish Caribbean, and later Napoleonic forces in Saint-Domingue.

Though perhaps not quite as paralyzing as mosquitoes, the lake system that surrounded the city of Tenochtitlan was a formidable natural force in its own right, protecting the metropolis on all sides from potential conquest. For this reason, one of the most important weapons for the final siege—on par with horses, gunpowder, or iron swords—was timber. Without this material the naval project would have been doomed, and the conquest itself seriously complicated. By emphasizing the importance of the natural world (trees, lakes, soil, rain), this article illustrates both subtle and profound ways in which the environment dictated decision-making, tilted the advantage of war, and shaped the direction of the conquest more broadly. This is not to suggest that the environment determined the course of the Spanish-Aztec War by itself. Rather, this article focuses on the actions of human agents within the environment—the Native peoples—who learned how to harness their local surroundings and wield it to their advantage.

To reconstruct the contributions of Native peoples to the naval episode, an array of Indigenous and Spanish sources must be pieced together. With respect to published material, fragments appear in the writings of the conquistadors and in colonial histories of the conquest, chiefly in the accounts of Cortés, Díaz del Castillo, Francisco Cervantes de Salazar, Juan de Torquemada, and the two Native historians Chimalpahin Quauhtlehuanitzin and Fernando de Alva Cortés Ixtlilxochitl.[23] Collectively, these texts shed light on all the major aspects of the naval program, from the transportation of the timber to the assembly of the ships and the excavation of the canal. More important, they provide nuggets of information pertaining to the Native peoples' involvement in those activities.

To supplement this information, and also buttress its veracity, this article draws on a handful of archival sources from the early to middle sixteenth century. Perhaps the most significant is the *Interrogatorio* (questionnaire) compiled by the

23. Cortés, *Letters from Mexico*; Díaz del Castillo, *Discovery and Conquest*; Cervantes de Salazar, *Crónica*; Tomás de Torquemada, *Monarquía indiana*, 3rd ed. (Mexico City: UNAM, Instituto de Investigaciones Históricas, 1975-1983); Chimalpahin, *Chimalpahin's Conquest*; Alva Ixtlilxochitl, *Native Conquistador*; Alva Ixtlilxochitl, *Obras históricas de Don Fernando de Alva Ixtlilxochitl*, 2 vols., Alfredo Chavero, ed. (Mexico City: Secretaria de Fomento, 1891-92). One of the most complete descriptions of the naval project comes from Cervantes de Salazar, who dedicated a considerable amount of attention to the construction, transportation, and launching of the ships. Though not an eyewitness, he based his account on conversations with some of the conquistadors involved in the shipbuilding project, including one of the brigantine captains, Gerónimo Ruiz de la Mota.

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inhabitants of Tlaxcala in 1565.[24] Comprised of 24 questions, the document was intended to highlight the extensive services that the Tlaxcalteca rendered to the crown during the conquest and the pacification of New Spain and other parts of the Indies. Notably, the sixteenth question in the *Interrogatorio* is concerned with the extent to which Tlaxcala contributed to the shipbuilding program.[25] To complete the questionnaire, the Tlaxcalteca selected 17 Spanish conquistadors to testify on their behalf. All were former members of Cortés's company.[26] At some point in 1565, those witnesses were summoned to court, where they swore an oath to provide truthful record of the events in question. While the oath may have elicited more forthright testimony, it does very little to redress the other flaws in this court case: it was conducted some four decades after the Spanish-Aztec War; all of the witnesses were handpicked by the Tlaxcalteca; the majority of the Spaniards testifying were over 65 years old (and far removed from the events); the questions ask only about the Tlaxcalteca, ignoring other Native allies.

Although the source is not without its defects, it would be wrong to say that it is of little value. Given that several of the witnesses discuss matters not treated in other sources, the *Interrogatorio* is crucial for filling the gaps in the record of the ship- and canal-building effort. Second, because the document contains statements from over a dozen witnesses, it can be juxtaposed with other accounts (for example, those of Cortés, Bernal Díaz, and Alva Ixtlilxochitl), providing us with a significant basis with which to validate, dispute, or confirm them. When *read alongside* the other sources, the interrogatory allows us to paint a richer, more balanced portrait of the nautical enterprise—one in which the Native peoples also played important roles. However, to render the naval story intelligible, it must first be contextualized within the broader contours of the Spanish invasion of central Mexico.

24. Interrogatory and Testimony, 1565, AGI, Patronato 74, N.1, R.13. The document was put together by the cabildo of Tlaxcala on behalf of the residents of that city. In the source, the Tlaxcalteca allege that Cortés promised them a number of rewards in return for their aid in the conquest and pacification of various parts of the Indies, including a share of the conquered land, the equal distribution of spoils, and perpetual exemption from tribute payment. Despite such promises, the residents of Tlaxcala complained that the viceroys of New Spain had disregarded the last-named promise, demanding that the Tlaxcalteca furnish 8,000 bushels of corn after each annual harvest. The purpose of the 1565 interrogatory, then, was to protest this imposition, but also to press for other favors and privileges (*favores y mercedes*) from the crown. While the crown would ultimately grant some privileges to the Tlaxcalteca, they were still forced to continue paying the 8,000 bushels of corn each year. Charles Gibson, *Tlaxcala in the Sixteenth Century* (Stanford: Stanford University Press, [1952] 1967), 159–160, 175–176.

25. More specifically, the *Interrogatorio* asks whether Cortés ordered the Tlaxcalteca to cut wood for the construction of 13 brigantines; whether the timbers were carried 18 leagues over the mountains, defended by Native warriors, captains, and *principales* (lords) of Tlaxcala; and whether more than 30,000 Indigenous people took part.

26. Those who testified were Francisco Rodríguez, Diego Valadés, Pedro de Solís Barraso, Pedro de Meneses, Francisco Montaño, Juan de Nájera (Nágera), Alonso Cortés de Zúñiga, Francisco de Olmos, Joan Pérez (de) Herrera, Martín López, Francisco Velázquez de Lara, Pedro (Cendejas) Moreno, Álvaro de Sandoval, Gonzalo Carrasco, Juan de Limpias de Carvajal, Alonso Soltero, and García de Aguilar.

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FOR GLORY AND RICHES: THE SPANISH INVASION OF CENTRAL MEXICO

On February 10, 1519, the would-be conquistador Hernando Cortés sailed from Cuba to the coast of Mexico with 11 ships, 16 horses, and about 500 men.[27] His route from Veracruz to Tenochtitlan is shown in Figure 2.

Under strict orders from Diego Velázquez de Cuéllar, the governor of Cuba, Cortés was not to conquer or settle the regions he reached, but merely to trade and reconnoiter the land. Whether or not Cortés ever intended to keep his word can be debated. What is certain is that the military commander, whether in pursuit of status, fame, or riches, eventually defied those orders. After making landfall in the Yucatán and traveling northwest along the coast, Cortés and the members of his company learned of a wealthy kingdom that lay in the heart of the Valley of Mexico, known as Tenochtitlan. Enticed by the allure of rich spoils, the expedition pressed forward into the interior, though not without the protest of a few Velázquez loyalists. During this inland incursion, as well as before it, the invaders managed to procure the support of a number of disgruntled tributary states under the dominion of the Aztec empire, along with other autonomous Native polities opposed to the rule of the Mexica (the residents of the sister cities of Tenochtitlan and Tlatelolco). Bolstered by these local forces, the Spanish company marched on the Aztec capital in late 1519, reaching the southern fringes of the city by November 8. With the armed invaders at the doorstep of Tenochtitlan, how was its *huey tlahtoani* (emperor), Montezuma, to receive them?

In a curious and often-scrutinized move, the Aztec ruler did not mobilize his armies to oust the intruders, but instead welcomed them into his island metropolis, offering them residence in one of his private palaces.[28] The conquistadors and their Native allies lived for six months within the confines of Tenochtitlan, in relative tranquility, until an abrupt change came in May of 1520—not from Montezuma, but from Governor Velázquez in Cuba. Incensed

27. Díaz del Castillo, *Discovery and Conquest*, 40–41. The historical literature on the Spanish-Aztec War is immense. For a clear and concise overview, see Hassig, *Mexico and the Spanish Conquest*.

28. The precise reason(s) that Montezuma welcomed Cortés into Tenochtitlan has been vigorously debated. The traditional historiography maintains that the emperor believed him to be the returning Aztec deity-king Quetzalcoatl, who had disappeared to the east many years ago and vowed to someday return to claim his throne. Scholars in recent decades have dismissed this interpretation, suggesting that Nahua (speakers of Nahuatl, the dominant language of Central Mexico) elites invented the legend in the aftermath of the Spanish-Aztec War to redirect the blame onto Montezuma and justify the defeat. Others postulate that the Native sovereign invited the Spaniards into the city intentionally so that he could observe them, learn their weaknesses, and potentially trap them inside. A more recent theory, and a riveting one, is that the Aztec ruler sought to add the Spaniards to his expansive zoo collection as exotic specimens. Matthew Restall, *Seven Myths of the Spanish Conquest* (New York: Oxford University Press, 2003), 114; Stuart B. Schwartz, *Victors and Vanquished: Spanish and Nahua Views of the Conquest of Mexico* (New York: Bedford/St. Martin's, 2000), 10; Camilla Townsend, "Burying the White Gods: New Perspectives on the Conquest of Mexico," *American Historical Review* 108:3 (June, 2003): 666–672; and Restall, *When Montezuma Met Cortés*, 222–223.

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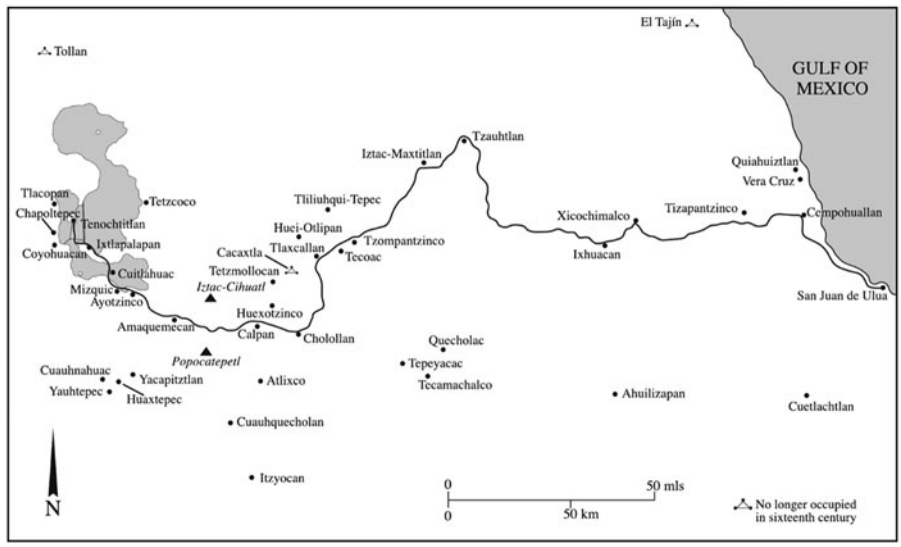
FIGURE 2
Route of Cortés's Company from Veracruz to Tenochtitlan



Source: Ross Hassig, *Mexico and the Spanish Conquest*, 2nd ed. (Norman: University of Oklahoma Press, 2006), 66. Reprinted by permission of the publisher.

over Cortés's disobedience, the governor dispatched a retinue of forces under the command of Pánfilo de Narváez to arrest the rebellious captain and bring him back to Cuba. When Cortés heard the news, he quickly departed for the coast with his main body of forces to confront the threat, leaving behind a small contingent of men in Tenochtitlan. During Cortés's absence from the city, his second-in-command, Pedro Alvarado, ordered the massacre of unarmed Mexica nobles during the festival of Toxcatl (in honor of the deity Tezcatlipoca), instigating an uprising in the city against the Spanish. When Cortés returned from the coast, victorious over the governor's forces, he found the city of Tenochtitlan in turmoil, and resolved to escape the chaos and the wrath of its inhabitants. During the ensuing flight from the capital on June 30, 1520, remembered as *La Noche Triste* ("the Sad Night"), the Mexica inflicted heavy casualties upon the invaders, striking down hundreds of Spaniards and well over a thousand Native allies as they evacuated the city on its western causeway.[29]

As the battered conquistadors collected themselves in friendly Tlaxcala, pondering their next steps, they must have recognized the grim prospects of a battle to conquer the island stronghold. Tenochtitlan's natural defenses would make the

29. Hassig, *Mexico and the Spanish Conquest*, 119–120.

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engagement a logistical nightmare. The Spanish cavalry would be virtually useless on the city's narrow land bridges, and the infantry would fare no better. The Mexica's fleet of canoes dominated the lake waters, and could easily pick off Spanish and Native foot soldiers with darts and arrows from the flanks. To stand any reasonable chance against the Mexica, and to otherwise tilt the war to their advantage, the attackers needed to establish control over the lake.[30] In September 1520, Cortés ordered his experienced shipbuilder, Martín López, to begin the construction of a naval fleet that could increase striking power on Lake Texcoco. In the meantime, the rest of the forces underwent other preparations for the impending siege: stockpiling provisions, reconnoitering the valley, and eliminating resistance in the surrounding provinces.

After nearly nine months of preparation, the Native-Spanish coalition assembled at Lake Texcoco on April 28, 1521, poised to commence the final assault. For the next three months, these joint forces laid siege to Tenochtitlan with great fury, enveloping the aquatic city on all sides and eventually reducing it to submission by August 13.[31] While much ink has been spilled on those final battles, the following sections are concerned with the crucial preparatory phase preceding it, chiefly between the autumn of 1520 and the spring of 1521.

INTO THE FORESTS OF TLAXCALA: FELL THE TIMBERS, FASHION THE PLANKS

At least formally, the naval project began in September of 1520, when Cortés instructed Martín López to travel to Tlaxcala to collect the timber for the ships.[32] From a logistical standpoint, the request itself appeared remarkably difficult, if not absurd. The forests of Tlaxcala lay over 60 miles from Lake Texcoco. Once the trees were cut and dressed, they would have to be transported over difficult mountain terrain to the main base of operations in

30. The Spanish grasped very early on the need to construct a navy. Already in late 1519, weeks after arriving in Tenochtitlan, Cortés ordered the construction of four brigantines to use in a potential naval assault of the city. Those ships were completed in early 1520, but destroyed in the spring of that year by the Mexica. For an account of the first shipbuilding program, see Gardiner, "The First Shipping Constructed in New Spain," *The Americas* 10:4 (1954): 409–419.

31. We do not know how many Native peoples accompanied Cortés in the final siege of Tenochtitlan, but Michel R. Oudjik and Matthew Restall believe that at least 24,000 Indigenous allies took part. Oudijk and Restall, "Mesoamerican Conquistadors in the Sixteenth Century," in *Indian Conquistadors*, Matthew and Oudijk, eds. (2007): 33.

32. The shipwright Martín López recorded the instructions from Cortés in his 1528 interrogatory: "Go to the city of Tlaxcala with your tools and everything you need and look for a place where you can cut a lot of oak, evergreen oak, and pine wood, and fashion them in a manner so that we can make thirteen brigantines" (*[ir] a la ciudad de Tascaltletle con vuestras herramis [herramientas] y todo lo necesario y busca donde podais cortar mucha madera de rroble y enzina y pinos y atavialdas de manera que podamos hazer treze vergantines*). Interrogatory, 1528, AGI, Patronato 57, N.1, R.1. Gardiner deduces that López received these orders in September of 1520, roughly six weeks after the start of the Tepeaca campaign, and three weeks after the founding of the town of Segura de la Frontera. *Naval Power*, 92.

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Tetzcoco—a route that crossed enemy territory. The decision to move forward with the operation, regardless of its appreciable logistical challenges, has been traditionally attributed to the brilliance and intrepidity of Cortés: "It was a bold conception," asserted William H. Prescott, "that of constructing a fleet to be transported across forest and mountain before it was launched on its destined waters! But it suited the daring genius of Cortés."[33]

Though undeniably bold, the idea to transport the ships overland does not appear to have stemmed from Cortés at all. In 1502, the Gran Capitán ("Great Captain") Gonzalo Fernández de Córdoba had resorted to similar tactics during his assault on the Italian lakeside city of Taranto, a locale bearing some resemblance to the city of Tenochtitlan.[34] Prior to the siege, the Gran Capitán ordered a portion of his fleet, then docked in the outer bay of the Ionian Sea, to be transported across the narrow isthmus separating the ocean from the inner lake. The Gran Capitán then used the ships to assault the negligently guarded part of the city facing the shoreline, helping to pave the way for his capture of Taranto.[35] Cortés in all likelihood was aware of the feat. The Gran Capitán was one of the most famous European generals of his age, and news of his exploits were widely circulated. What's more, two members in Cortés's own *compañía*, Antonio de Sotelo and Andrés de la Tovilla, had fought alongside the Gran Capitán in the Italian wars, and may have proposed replicating the same tactics at Tenochtitlan.[36] From this vantage, Cortés was not the genius who came up with the idea to transport the ships ad hoc, nor did he play any sort of significant role for the remainder of the naval project.[37]

When Martín López arrived in Tlaxcala, sometime in late September, the Natives of the province escorted him into the nearby wooded forest on the slopes of Matlalcueitl (known now as La Malinche) volcano.[38] Given the intended size

33. Prescott, *Conquest of Mexico*, 639.

34. Point is made by Prescott, *Conquest of Mexico*, 639, n24. Few modern histories of the Spanish-Aztec War have posited this connection. For an exception, see Iván Vélez, *La conquista de México: una nueva España* (Madrid: La Esfera de los Libros, 2019), 216.

35. Paulo Giovio, *La vida de Gonzalo Hernández de Córdoba llamado por sobrenombre El Gran Capitán*, Pedro Blas Torellas, trans. [1554], in Antonio Rodríguez Villa, *Crónicas del Gran Capitán* (Madrid: Bailly, Balliére é hijos, 1908), 96–98.

36. Vélez makes a similar assertion: "No hemos de olvidar que en el ejército español iban algunos veteranos de las guerras de Italia que bien pudieron rememorar aquella audacia de Gonzalo Fernández de Córdoba." *La conquista de México*, 216. On the two veteran soldiers from the Italian Wars, see Hugh Thomas, *Who's Who of the Conquistadors* (London: Cassell & Co, 2000), 123, 133.

37. Still, if Cortés did not get the idea from the Gran Capitán, he may have drawn inspiration from Vasco Núñez de Balboa, the discoverer of the Pacific. In 1516, Balboa constructed four brigantines on the Isthmus of Darien and ordered them to be transported over 70 miles to the coast. Considering that this took place only a few years prior to the Cortés expedition, it is possible that someone in the company was apprised of the undertaking and put forth the idea. Antonio de Herrera y Tordesillas, *Historia general de los hechos de los Castellanos en las Islas y Tierra Firme del Mar Océano* (Madrid: Imprenta Real, 1601-1615), Decade 2, Book 2, chapt. 11.

38. Torquemada believed that the woodcutters visited the forests near the Matlalcueitl volcano. *Monarquía indiana* [1615], 3 vols. (Madrid: En la oficina y a costa de Nicolás Rodriguez Franco, 1723), 1:524.

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of the ships—12 of them would measure between 40 and 42 feet in length, and another, the flagship, would measure 48 feet—a significant quantity of wood would have to be extracted from the forest.[39]

For hundreds of years, local inhabitants had assiduously cultivated the wooded area, an effort that provided oak, evergreen oak, and pine trees large enough to support the construction of sizable crafts. Once the wood was sawed and trimmed, Indigenous *tameme* (porters) shouldered the timbers, bearing them out of the forests to the banks of the Río Zahuapan, located slightly upstream from Tlaxcala.[40] Here, at the river, skilled Indigenous artisans under the supervision of López converted them into finished beams and planks, duly numbering each for assembly.[41] Though the precise number of Native people who helped to chop, trim, carry, and shape the timbers cannot be determined, one informant in the Tlaxcala *Interrogatorio* acknowledged that it required the efforts of "*muchos yndios*" (many Indians).[42] Collectively, the presence of these scores of Native assistants indicates that Indigenous collaborators, both skilled and unskilled, occupied central and pivotal roles from the very outset of the project, namely in executing much of the laborious and backbreaking work for the Spanish.

While the timber was being prepared in Tlaxcala, Cortés dispatched several of his men to Veracruz for an important task. Prior to the Spanish foray into central Mexico, Cortés had scuttled his ships off the coast of Veracruz to prevent disgruntled Spaniards, namely those loyal to Governor Diego Velázquez, from sailing back to Cuba. Cortés had the vessels dismantled and the maritime gear removed, including the sails, rigging, nails, ironwork, and tackle. At some

39. Gardiner, *Naval Power*, 104.

40. Gardiner, *Martín López*, 39. For a fuller treatment of the role of tameme in Central Mexico, see Ross Hassig, *Trade, Tribute, and Transportation: The Sixteenth-Century Political Economy of the Valley of Mexico* (Norman: University of Oklahoma Press, 1985).

41. Interrogatory and Testimony, 1565, AGI, Patronato 74, N.1, R.13. One witness in the *Interrogatorio de Tlaxcala*, Alonso Soltero, confirms this work: "The Indians of the province [of Tlaxcala] cut and fashioned the planks and beams for them" (*los dichos yndios cortaron y labraron en la dicha su provincia la tablazon e ligazon para ellos*). Another witness, Francisco de Olmos, asserted that the Tlaxcalteca performed the majority of the carving: "los dichos yndios de Tlaxcala truxieron la madera [y] labrada la mayor parte della." Díaz del Castillo, too, acknowledges the participation and significance of the Spaniards' Indigenous assistants at this time: "Martín López made such speed in cutting the wood with the great assistance rendered him by the Indians, that he had the whole of it cut within a few days, and each beam marked for the position which it was intended to occupy." Bernal Díaz del Castillo, *The True History of the Conquest of New Spain* [1568], Alfred Percival Maudslay, trans. and ed., 5 vols. (London: Hakluyt Society, 1908-1916), 2:300–302.

42. Interrogatory and Testimony, 1565, Testimony of Gonzalo Carrasco, AGI, Patronato 74, N.1, R.13: "many Indians from the province of Tlaxcala helped and worked, some brought wood from the mountains and others carved it to make the planks" (*ayudaron e travajaron muchos yndios de la dicha provincia de Taxcala unos en traer madera de los montes y otros en labrarla y hazer la tablazon*). Tlaxcala's neighbor, Huejotzingo, additionally contributed to these operations. In a 1560 letter to the crown, the inhabitants of the *altepetl* declared: "And it was we who worked so that they could conquer the Mexica with boats; we gave them the wood and pitch with which the Spaniards made the boats." See "Letter of the Cabildo of Huejotzingo to the King, 1560," in Lockhart, *We People Here*, 291.

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point in December of 1520, Cortés ordered his men to retrieve those materials from Veracruz and transport them to Tlaxcala for the construction of the ships.[43] Due to the size and weight of the vessel parts—the anchors alone were known to weigh between 70 and 80 pounds each—1,000 Native tameme were dispatched to haul the pieces overland from the coast to Tlaxcala.[44] Although the sources do not indicate exactly when those materials arrived in Tlaxcala, we do know that the nautical equipment would have allowed Martín López to proceed with the next phase of his plans for the brigantines: assemble them and then test them in a nearby water source to ensure that they were buoyant enough to float. In the early months of 1521, at least one of the vessels was carefully pieced together on the banks of the Río Zahuapan and readied for testing, but in order to launch it there was first another matter to attend to.[45]

Since it was winter, the dry season in that region, the Zahuapan was too shallow to float the brigantines, requiring the construction of an earthen dam to increase its depth. Gardiner indicates that the damming of the river took place several miles upstream from Tlaxcala, near the small community of Tizatlán, and that Martín López directed the operation.[46] A lack of Native accounts of the episode makes it difficult to confirm whether or not López was indeed in charge of the task, but it is probably safe to assume he was. After all, he was the master shipwright, and the person at the helm of the entire shipbuilding project. Even so, there is nothing that indicates clearly that we must credit the Spaniard with the idea to build the dam, or with its actual construction. The latter responsibility presumably fell upon the Native peoples, who throughout the Spanish-Aztec War routinely, if not always, executed its most strenuous tasks.[47] Besides, dams were known to have been constructed in Mesoamerica for over 2,000 years, chiefly for diverting water out of seasonally flowing conduits into irrigation canals, or to prevent flooding in cities.[48] The

43. Cortés, *Letters from Mexico*, 165.

44. Hassig, *Mexico and the Spanish Conquest*, 135. The weight of the anchors is according to Bartolomé de las Casas. Pedro de Alvarado, *An Account of the Conquest of Guatemala in 1524*, Sedley J. Mackie, ed. and trans. (New York: The Cortés Society, 1924), Appendix 4, 133.

45. It is unclear how many vessels were tested during the trials. The time-consuming nature of assembling and then disassembling more than a dozen ships, coupled with the relative danger of damaging the wood in the process, makes it likely that just one ship was tested during the buoyancy trial at Tlaxcala. Besides, all of the pieces for the crafts, with the possible exception of the larger flagship, were modeled to the same dimensions and fashioned with the same types of wood. Torquemada upholds this view. *Monarquía indiana* (1975), vol. 2, Book 4, chapt. 84, 257. Gardiner believes the trials in the Zahuapan took place in early 1521. *Martín López*, 41.

46. Gardiner, *Naval Power*, 103–104.

47. Oudijk and Restall, "Mesoamerican Conquistadors in the Sixteenth Century," in *Indian Conquistadors*, Matthew and Oudijk, eds. (2007): 28–64.

48. The oldest-known dams in Mesoamerica were found at Teopantecuanitlán in the state of Guerrero (c. 1200 BC); in the Tehuacán Valley in the state of Puebla (c. 700 BC); and at Monte Albán in Oaxaca (c. 500 BC). Stake-and-brush dams were discovered near Teotihuacán around AD 800. William E. Doolittle, "Indigenous Development of Mesoamerican Irrigation," *Geographical Review* 85:3 (1995): 303–306.

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residents of this region clearly knew how to engineer a dam, and if called upon would likely have executed the task with relative ease.[49]

What is certain is that the dam succeeded in its purpose. The waters of the Zahuapan swelled to new heights, allowing the nearly flat-bottomed vessels, which drew between two and two-and-one-half feet of water, to navigate the river without any complications.[50] As the buoyancy trials unfolded, a cohort of Native people gathered around the edges of the river to bear witness. Gardiner, speculating on the possible thoughts of those Native onlookers, surmised that "the handiwork of the white men would have been a strange sight indeed to the non-nautical-minded natives of Tlaxcala."[51] Such a comment, besides conjecturing the impossibly-known thoughts of the Indigenous peoples, fails to acknowledge the collaborative nature of the enterprise, in which much of the "handiwork" of the ship-building project, not to mention the backbreaking work, fell upon the Native peoples. Further, though not a seafaring people, the Tlaxcalteca had proven themselves highly capable shipbuilders up to this point, not only mirroring Martín López's blueprints on how to cut and trim the wood to appropriate lengths, but also shaping and polishing the beams with obvious skill and precision.[52]

Once tested, the ships were laboriously dismantled, bound, and readied for transport to Spanish headquarters in Tetzcoco (see Figure 3). The written accounts of the conquistadors do not expound on why Tetzcoco was selected as the main base of operations, but several factors likely converged to make it the pragmatic choice.

First, the besiegers clearly needed a lakeside base so that they could assault Tenochtitlan by both land and water. Among the communities along the eastern shore of the lake, Tetzcoco was appreciably larger than many, guaranteeing it could provide food and lodging to support Spanish forces for months at a time, as preparations proceeded toward the final siege.[53] Second, the *altepetl* was among the closest points on Lake Texcoco to one of the Spaniards' most significant allies, the Tlaxcalteca. When the time came for war, this meant efficient lines of communication between the two provinces, as well as speedy transportation of Tlaxcalteca warriors and resources to the front

49. The residents of Tizatlán may have offered a hand in its construction. The small Native community was situated only a quarter-mile above the dam site, which lay almost in their backyards.

50. Gardiner, *Naval Power*, 131.

51. Gardiner, *Naval Power*, 104.

52. Díaz del Castillo credits López with providing "the model and dimensions for the boards." *Discovery and Conquest of Mexico*, 353.

53. Alva Ixtlilxochitl described how his Tetzcocan ancestors provided the Spaniards with "everything they needed, including food and service (*servicio*)" during their five-month stay. *Obras históricas*, 1:442.

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FIGURE 3
Map of the Basin of Mexico, c. 1519

Source: Map by Olga Vanegas, courtesy of Barbara E. Mundy. From Mundy, *The Death of Aztec Tenochtitlan, The Life of Mexico City* (Austin: University of Texas Press, 2015).

lines.[54] Third, and perhaps most vital, Tetzcoco was geographically more distant from Tenochtitlan than many of the other principal lakeshore communities, particularly those along the western and southern shores. The relative distance

54. Gardiner, *Naval Power*, 113.

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separating the two embattled sides could offer a greater buffer for shielding the Spanish camp as well as the improvised shipyard, which lay further inland. As will be seen, the insular position of the construction site proved a wise choice, for the Mexica made several audacious attempts to burn the unfinished vessels in the months leading up to the final siege.

THE TETZCOCO SHIPYARD: CARRY THE CRAFTS, ASSEMBLE THE SHIPS

With the end of winter approaching, the preliminary phase of the project was nearing its conclusion. For five months, Spanish and Native laborers had worked incessantly to ensure that all of the timber was cut, dressed, marked, and converted into appropriately sized pieces.[55] Such activities were undoubtedly demanding and tedious, though it is worth emphasizing that the most herculean work of the naval enterprise still lay ahead. The Indigenous-Spanish coalition still had to haul the prefabricated vessels from Tlaxcala to Tetzcoco, which, together with the construction of the canal, would be one of the most remarkable exploits of the naval episode, if not the entire conquest.

When the time came to transport the crafts, in late February of 1521, at least 8,000 Indigenous tameme from Tlaxcala, Huejotzingo, and Cholula loaded the timbers, the anchors, the ironwork, the sails, and the rigging onto their shoulders, while another 2,000 Native people carried foodstuffs for the massive convoy (see Figure 4).[56] Perhaps most impressive was not the large number of porters required for the task, but the immense distance to the target point, over 60 miles, as well as the treacherous nature of the terrain. Indeed, according to several witnesses in the *Interrogatorio de Tlaxcala*, the materials would have to be transported over rugged mountain passes and many "*malos caminos*" (bad roadways).[57]

55. Martín López states in his 1528 interrogatory that five months were spent on this phase of the project ("estuvo espacio de cinco meses"). Numerous witnesses who served as workers on the brigantines confirm this timetable, citing between four to five months of work. Interrogatory and testimony, 1528, AGI, Patronato 57, N.1, R.1. Gardiner believes all of the labor in the Tlaxcala phase was completed by late February 1521. *Naval Power*, 119.

56. Cervantes de Salazar and Cortés claimed that between the carriers of wood and equipment there were more than 8,000 men, while Diego Durán asserted that more than 10,000 Native people transported the materials. Díaz del Castillo adds that 2,000 Native people were charged with transporting foodstuffs. The *Interrogatorio de Tlaxcala* also confirms the presence of large numbers of cooks. One witness, Pedro Moreno, noted that there were "many Indians with food (*muchos yndios con comida*), while a second witness noted that there was a "large quantity of Indians for its defense, and others charged with food" (*otra mucha cantidad de yndios para su defensa y otros cargados de comida*). Cervantes de Salazar, *Crónica*, Book 5, chapt. 69; Cortés, *Letters from Mexico*, 185; Diego Durán, *The History of the Indies of New Spain*, Doris Heyden, ed. (Norman: University of Oklahoma Press, 1994), 550; Díaz del Castillo, *The True History of the Conquest of Mexico*, Maurice Keatinge, ed. (New York: Robert M. McBride & Company, 1927), 298;, 1565, AGI, Patronato 74, N.1, R.13.

57. One witness in the *Interrogatorio de Tlaxcala*, Diego Valadés, notes that the distance to transport the materials was 15 or 16 leagues, while two other witnesses, Joan Pérez de Herrera and Martín López, claim it was 18 leagues. Three

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FIGURE 4

Transport of the Brigantines from Tlaxcala to Tetzcoco: "Gonzalo de Sandoval Leads the Brigantines to the Lagoon"

Source: This late eighteenth-century painting by an anonymous artist was based on the illustrations that accompany the work of Antonio de Solís y Rivadeneyra, *Historia de la Conquista de México* [1684] , 2 vols. (Madrid: Imprenta de D. Antonio de Sancha, 1783-1784). The image depicts the movement of the massive convoy through forest and mountains, with Native people carrying the planks, beams, and other equipment necessary for the construction of the ships. *Conquista de México* series, 24 paintings, 1783–1800 (oil on copper, 66.20 cm x 49.30 cm), Museo de América, Madrid. Photograph by Joaquín Otero Úbeda, Ministerio de Cultura y Deporte, España, *CER.es*, https://ceres.mcu.es/pages/Main?idt=213&inventary=00227&table=FMUS&museum=MAM, accessed October 17, 2023.

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To defend the caravan, a force of 20,000 Native combatants, consisting of some of Tlaxcala's finest warriors, would accompany the tameme.[58] Among them was one of the principal lords of the province, Chichimecatlecle, who occupied the lead point with a division of 10,000 warriors.[59] The sources inform us that tensions flared between him and the Spanish captain, Gonzalo de Sandoval, after the Castilian commander made an impromptu rearrangement in the order of the column, situating Chichimecatlecle's contingent as the rearguard.[60] The Native lord, if we are to trust the account of Cervantes de Salazar, declared that "he would rather die than consent to such an affront," adding, with a defiant flourish, that "while entering Mexico he was to always go out in front, and that they are not to argue with him about this, or else he and his people would return to Tlaxcala."[61] The Spaniards managed to placate the irate lord, assuring him that the most vital and honorable position in the train actually lay in the rearguard, the position most susceptible to an ambush. Only with this reasoning did Chichimecatlecle agree to the change, "*aunque con harta dificultad*" (although with great difficulty).[62]

The Native-Spanish force that marched toward Tetzcoco comprised over 30,000 persons in an enormous column that stretched more than six miles in length.[63] Of that number, only 215 were Spanish: 200 foot soldiers and 15 horsemen.[64] Thus, the Spaniards made up considerably less than 0.01 percent of the convoy. While

witnesses point out the rugged nature of the pathways: "del camino montes y tierra aspera" (Diego Valadés); "por caminos muy agros e travajosos" (Alonso Cortés de Zúñiga); and "del camino sierra y malos caminos," (Joan Pérez de Herrera). Cortés noted that the distance covered was 18 leagues, while Cervantes de Salazar and Torquemada believed it to be 20. Interrogatory and Testimony, 1565, AGI, Patronato 74, N.1, R.13; Cortés, *Letters from Mexico*, 185; Cervantes de Salazar, *Crónica*, Book 5, chapt. 69; Torquemada, *Monarquía indiana* (1975), vol. 2, Book 4, chapt. 85, 259.

58. Spanish and Native sources tend to agree on this number. Ixtlilxochitl claims that nearly 20,000 warriors from Tlaxcala, Huexotzinco, and Cholula accompanied the convoy. Cortés and Cervantes de Salazar both cite 20,000 Native warriors. Díaz del Castillo notes a far lower number, asserting that only 8,000 Native warriors were present. Alva Ixtlilxochitl, *Native Conquistador*, 31; Cortés, *Letters from Mexico*, 185; Cervantes de Salazar, *Crónica*, Book 5, chapt. 69; Díaz del Castillo, *True History*, 298.

59. Cortés, *Letters from Mexico*, 185; Cervantes de Salazar, *Crónica*, Book 5, chapt.69.

60. Cortés, *Letters from Mexico*, 185; Cervantes de Salazar, *Crónica*, Book 5, chapt. 70; Díaz del Castillo, *True History* (1927), 298.

61. Cervantes de Salazar, *Crónica*, Book 5, chapt. 70.

62. Cervantes de Salazar, *Crónica*, Book 5, chapt. 70. Cortés and Díaz del Castillo both confirm this story. See Cortés, *Letters from Mexico*, 185; and Díaz del Castillo, *True History* (1927), 298.

63. Cortés noted: "I assure Your Majesty that there were more than two leagues from the vanguard to the rear." Cervantes de Salazar concurred: "The column extended from the vanguard to the rearguard almost two leagues." Gardiner claims that 50,000 men comprised the column, based on the belief that 40,000 Native warriors protected the shipment (10,000 in the vanguard, 10,000 in the rearguard, and another 10,000 for each of its flanks). However, Cortés, Cervantes de Salazar, Alva Ixtlilxochitl, and some of the witnesses in the *Interrogatorio de Tlaxcala* generally agree that the number of Native warriors was 20,000 (and not 40,000) in total. Cortés, *Letters from Mexico*, 185; Cervantes de Salazar, *Crónica*, Book 5, chapt. 69; Alva Ixtlilxochitl, *The Native Conquistador*, 31; Interrogatory and Testimony, 1565, AGI, Patronato 74, N.1, R.13; and Gardiner, *Naval Power*, 116.

64. The numbers for the Spanish troops come from Cortés. This was confirmed by Cervantes de Salazar, who added that half of the Spanish forces (eight on horseback and 100 foot soldiers) were attached to the vanguard, and the other half were at the rear. Cortés, *Letters from Mexico*, 185; Cervantes de Salazar, *Crónica*, Book 5, chapt. 69.

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the presence of this small cohort of Spanish soldiers may have deterred a possible ambush on the road to Tetzcoco, it was in reality the massive column of tens of thousands of Native warriors, marching two by two in tight formation, that would have forced any assailants to think twice about engaging the heavily guarded train. Even so, Díaz del Castillo indicates that the caravan had to take precautions nonetheless, as the materials were being transported through enemy territory.[65] Indigenous guides were therefore of tremendous value, knowing not only the least rugged routes to take, but also which ones to avoid to evade surprise assaults. According to the sources, the warlike column marched for three days and reached Tetzcoco on the fourth, with no attack made on the convoy.[66]

When the caravan at last crossed over into Tetzcoco, the company poured forth through the city in brilliant display. Of particular note was the entry of the Tlaxcalteca, as observed by Díaz del Castillo: garbed in their finest attire, they "marched in good order to the sound of drums and trumpets, . . . and in an unbroken line they were half a day marching into the City, shouting, whistling, and crying out 'Viva! Viva! for the Emperor our Lord and Castile! Castile and Tlaxcala! Tlaxcala!'"[67] The Native peoples of Tlaxcala had good reason to chant the name of their province alongside that of Castile. Up to this point, the Tlaxcalteca had played a paramount role in the shipbuilding enterprise, guiding the Spanish into their forests and purveying much of the timbers, sawing and dressing the crude logs, shaping them into finished pieces, and transporting them to the lakeshore. The Tlaxcalteca from this vantage clearly grasped their importance to the naval project, and did not hesitate to call attention to their rightful place alongside the Castilians—not as subsidiary allies, but as equal contributors to the enterprise.[68]

According to Cortés, the immense convoy continued its procession through the city of Tetzcoco for another six hours, until the tail end of the column had at last reached the main base of operations.[69] As soon as all of the timbers and nautical equipment were laid down in the shipyard, the master shipwright Martín López informs us that he and his team of carpenters immediately went to work on assembling the crafts.[70] Because much of the arduous work of hewing and

65. Díaz del Castillo wrote: "The enemy appeared only in small bodies at a distance, but it was thought necessary to use much precaution, considering the extent of the line of march, and the danger of a surprise." *True History* (1927), 298.

66. Cortés, *Letters from Mexico*, 186; Díaz del Castillo, *Discovery and Conquest*, 353.

67. Díaz del Castillo, *Discovery and Conquest*, 353–354.

68. Laura Matthew drew a similar conclusion in her study of the Indigenous conquistadors of Guatemala (Nahua, Zapotec, and Mixtec) and their descendants, indicating how members of this group did not view themselves as passive, subsidiary allies in the conquest, but prideful conquerors in their own right. Matthew, *Memories of Conquest*, 2, 122, 279.

69. Cortés, *Letters from Mexico*, 186: "there were so many people in this train that from the moment the first one had entered until the arrival of the last more than six hours passed, and not once was that long line broken."

70. 1528, AGI, Patronato 57, N.1, R.1: "luego quel dicho Martin Lopez traxo los dichos vergantines en piecas a la ciudad de tesaico [Tetzcoco] puso en obra de hazer los dichos vergantines los quales hizo." Francisco López de Gómara,

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carving the timbers had already been done in Tlaxcala, and because the individual beams had been pre-marked and numbered, we can assume that the assembly of the ships in Tetzcoco progressed rather swiftly.[71] Once all the pieces were joined, only finishing touches needed to be made to the vessels: rigging the masts, fastening the sails to the spars, caulking the hulls, and mounting the guns in the bow of each craft. How much of this labor fell upon López's Native assistants is impossible to determine. In the Spanish chronicles, little credit is given to Indigenous peoples in this work, though judging from the illustration that accompanies Diego Durán's magnum opus, *The History of the Indies of New Spain* (1579), we see that Native allies were actively engaged in the shipbuilding operations (see Figure 5).[72]

One of the more conspicuous aspects of the above image (Figure 5) is that the Indigenous laborers, seen felling timbers, outnumber their Spanish counterparts by four to one. While this by no means represents a precise ratio of Native to Spanish workers, it nonetheless illustrates that Indigenous people constituted the bulk of the brigantine labor force, and would have outnumbered the Spaniards in the shipyard many times over. Further, and additionally revealing, is that the Native people, and not the Spanish, are situated at the center of the illustration. This may very well have been a symbolic placement, signifying the centrality of Native peoples to the shipbuilding enterprise, and how they formed (at least from the perspective of the Indigenous artist) the nucleus of the amphibious operation.

As the shipbuilding project entered its final phases, Native products local to the region, especially some found in the surrounding forests, became critical to its completion. One important material still needed was pitch, a sticky resinous substance used for the caulking, or waterproofing, of the vessels.[73] The manufacturing of the product entailed a multistep process: resin was collected from pine trees and next boiled carefully in a cauldron (for the extracted sap was highly flammable). Finally the sap was mixed with crushed charcoal to produce the desired consistency. In a letter to the Spanish crown in 1560, the

however, claims that the project did not begin until four days after the arrival of the wood in Tetzcoco. *Cortés: The Life of the Conqueror*, 251.

71. According to the Native writer Alva Ixtlilxochitl, additional timber was obtained from the nearby forests of Tetzcoco, which had been planted nearly 50 years earlier during the reign of the philosopher-ruler, Nezahualcoyotl. Gardiner believes this wood was probably used for supplemental purposes, such as fashioning oars. Alva Ixtlilxochitl, *Obras históricas*, 2:416; Gardiner, *Naval Power*, 125.

72. Alva Ixtlilxochitl asserts that Tetzcoco contributed "a large quantity of carpenters." Durán indicates that Chalco also sent a group of artisans to help assemble the ships. Alva Ixtlilxochitl, *Obras históricas*, 1:443; Durán, *History of the Indies*, chapt. 77, 550.

73. Pitch could be found in the pines in the vicinity of Huejotzingo. Cortés, *Letters from Mexico*, 165; Díaz del Castillo, *True History* (1927), 287.

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FIGURE 5
Assembly of the Brigantines in Tetzcoco

Source: At the Tetzcoco shipyard, Spanish and Native people work side by side to build the 13 brigantines, felling timbers, carving wood, and otherwise completing the construction of the crafts under Indigenous-Spanish supervision. Diego Durán, *Historia de las Indias de Nueva España e islas de la tierra firme* (1579), chapt. 77, 216. Image from the National Library of Spain.

residents of Huejotzingo claim to have furnished the adhesive substance to the Spanish.[74] In addition to pitch, cotton, oil, and oakum (a loose, tar-impregnated fiber) were also needed for caulking the ships.[75] Of those materials, cotton was probably the easiest to locate. The cotton plant was abundant to the region and had been used for a variety of purposes across Mesoamerica, woven into textiles, and quilted to manufacture lightweight armor, and also used as a remedy to treat snakebites as well as ulcers and other skin diseases.[76]

74. "Letter of the Cabildo of Huejotzingo to the King, 1560," in Lockhart, *We People Here*, 291. One witness in the *Interrogatorio de Tlaxcala*, Gonzalo Carrasco, asserts that the inhabitants of Tlaxcala also supplied the Spanish with the sticky material: "en los montes de la dicha ciudad de Tlaxcala . . . los yndios de la dicha provincia cortaron y labraron y sacaron la brea y otros aderecos a ellos necessarios." According to Díaz del Castillo, the Native peoples were unfamiliar with the process of manufacturing pitch. If this is true, the residents of Huejotzingo and Tlaxcala would likely have furnished the pine resin that the Spanish later converted into the finished product. Interrogatory and Testimony, 1565, AGI, Patronato 74, N.1, R.13; Díaz del Castillo, *True History* (1927), 287.

75. Chimalpahin, *Chimalpahin's Conquest*, 308; López de Gómara, *Cortés: The Life of the Conqueror*, 262.

76. Frances F. Berdan, "Cotton in Aztec Mexico: Production, Distribution and Uses," *Mexican Studies/Estudios Mexicanos* 3:2 (1987): 235–262. The writings of the conquistadors and later Spanish chroniclers make numerous

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Though cotton was plentiful, obtaining it quickly and in sufficient quantity required Indigenous knowledge of Mesoamerican trade networks and the main provinces that produced the soft, fibrous substance.[77] With time of the essence, and the Indigenous-Spanish laborers busy assembling the brigantines, the proficiency of the Native peoples in collecting the materials, and doing so in a timely fashion, ensured that the operations progressed smoothly and along the projected timeline.

EXCAVATE THE CANAL

As the Spanish and Indigenous people worked to assemble the brigantines, an even more onerous project was simultaneously underway, the construction of a 9,100-foot canal (*zanja*) needed to launch the landlocked crafts into the lake. The execution and supervision of the project was entrusted to Ixtlilxochitl, tlahtoani of Tetzcoco, who had recently forged an alliance with Cortés to help solidify his claim to the Tetzcocan throne (see Figure 6).[78]

The fact that we have no testimonies from Spaniards claiming that they labored on the canal, or helped to engineer it in any way, suggests that Ixtlilxochitl and his advisers presumably executed all of its construction, including conceptualizing the plan, determining the physical location, supervising the excavation process, and directing the engineering feats.[79] While extensive, such work should not have troubled the Tetzcocan ruler.

Ixtlilxochitl came from a lakeshore region of Mexico renowned for its mastery in civil engineering, and particularly in hydrological affairs. His neighbors, the Mexica, were especially esteemed for their expertise in water management, having performed a number of impressive hydrological works over the course of the fifteenth century such as the construction of canals, aqueducts, causeways, dikes, ditches, and sluice gates.[80] Of those achievements, canals

references to the abundance of cotton in the region. Typically, the product was presented to the Spanish as gifts from local lords in the form of fine cotton tunics, cotton cuirasses, and other cotton clothing.

77. Prior to the Spanish invasion, four principal provinces (Cihuatlan, Quauhtochco, Atlan, and Tzicoac) provided their Aztec overlords with cotton in the form of tribute payments. Berdan, "Cotton in Aztec Mexico," 243.

78. Alva Ixtlilxochitl, *Native Conquistador*, 31. Matthew Restall argues that Ixtlilxochitl had much deeper motivations for allying with Cortés: "Ixtlilxochitl seized his opportunity not only to become *tlahtoani* of his father's entire territory, but to expand it at the expense of the Mexica. . . . With the help of the Tlaxcalteca and their foreign allies [the Spanish], he could shift the balance of power in the valley and turn *his* Tetzcoco into the imperial capital." Restall, *When Montezuma Met Cortés*, 260.

79. Even Gardiner admits "that the half-league canal was almost completely an Indian achievement." *Naval Power*, 125.

80. Mundy, *The Death of Aztec Tenochtitlan*, 34–39.

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FIGURE 6
Ixtlilxochitl, Lord of Tetzcoco, c. 1552

Source: From the *Lienzo de Tlaxcala* (c. 1552), an Indigenous painted cotton sheet depicting this region's participation in the Spanish-Aztec War. Center for Latin American and Caribbean Studies, Brown University, and Prolarti Enterprises, LLC., Mesolore Project, www.mesolore.org, accessed October 18, 2023.

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were one of the more pervasive/dominant features within the Basin of Mexico.[81] Though the number of canals in and around the lake area at the time of the conquest is not known, the *Mapa Uppsala*, an Indigenous painted map of the Basin of Mexico (c. 1537-55), clearly illustrates the prominence of these waterways (see Figure 7).

The map, oriented with West at the top, is an aerial view of Mexico City and its environs a few decades after the Spanish-Aztec War, and displays in colorful detail the numerous water channels (dark blue lines) that crisscross the lacustrine region.[82] While some of those waterways appear to have been natural, we do know that others had been engineered by the lake-dwelling residents (including the Tetzcocans) for the irrigation of agriculture and for aquatic transport.[83] This is evidenced in the bottom left quadrant of the map, where the artist(s) painted dark blue lines in Lakes Chalco and Xochimilco to convey that canals were operative in those areas. During the dry season, those water roads would have been of great utility to rowers, allowing them to pass through the shallow areas of the lakes as they made their way to various markets and other terminal points.[84] All of this is to say, then, that before the Spanish ever stepped foot in the Valley of Mexico, the inhabitants of this region had a well-developed tradition of canal-building already in place and relied on the channels to support the needs of everyday life.[85] Thus, when the moment came in 1521 to engineer a canal for the launch of the brigantines, the residents of Tetzcoco would not have been baffled; they would have been supremely equipped to carry out the task.

81. Alexandra Biar, "Navigation Paths and Urbanism in the Basin of Mexico before the Conquest," *Ancient Mesoamerica* 34:1 (2023): 114–118.

82. Figuring rather prominently in the lower horizontal half of this map is the great Dike of Nezahualcoyotl (c. 1449-50), a massive ten-mile structure built in the waters of Lake Texcoco (see figure 3). The dike, which appears on the map as a light yellow-brown wall, was of utmost significance to the residents of Tenochtitlan, as it helped to protect the city from floods, and to prevent the salty waters of eastern Lake Texcoco from pouring into the Laguna of Mexico, a freshwater enclave in the western corner of the lake. Ixtlilxochitl's grandfather, the poet-philosopher-ruler, Nezahualcoyotl, was believed to have played a significant role in its construction, not only offering his engineering know-how on the project, but also purveying the services of thousands of his subjects to labor on the enormous dike. Mundy, *The Death of Aztec Tenochtitlan*, 35–38; Gardiner, *Naval Power*, 51. For more on Nezahualcoyotl, see José Luis Martínez, *Nezahualcoyotl: vida y obra* (Mexico City: Fondo de Cultura Económica, 1972); and Jongsoo Lee, *The Allure of Nezahualcoyotl: Pre-Hispanic History, Religion, and Nahua Poetics* (Albuquerque: University of New Mexico Press, 2008).

83. Mundy, *The Death of Aztec Tenochtitlan*, 34–35; Conway, *Islands in the Lake*, 90, 128; Biar, "Navigation Paths," 114–118. The Nahua historian, Chimalpahin, speaks of irrigation canals in place in Tetzcoco at the time of the Spanish-Aztec War. *Chimalpahin's Conquest*, 308.

84. Mundy, *The Death of Aztec Tenochtitlan*, 41.

85. The *Codex Mendoza*, an Indigenous painted manuscript from the mid sixteenth century, contains dozens of Nahua hieroglyphs that depict canals and waterways, some of which appear to have been engineered. For a digital collection of those glyphs in high-resolution, see *Visual Lexicon of Aztec Hieroglyphs*, Stephanie Wood, ed. (Eugene: University of Oregon, Wired Humanities Projects, ©2020-present), Version 1.0.

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FIGURE 7
The *Mapa Uppsala* (Map of Santa Cruz), c. 1537–55

Source: Hand-painted on skin by an unknown Indigenous artist(s), this map offers one of the richest portraits of Mexico City and its surroundings in the decades following the Spanish-Aztec War. Of particular note is the attention paid to the intricate system of dikes and canals that extended across the lake area, and the intriguing images of day-to-day affairs, such as fishing, rowing, and the overland transport of merchandise. Image courtesy of Uppsala University Library, Sweden.

Since we have to surmise, the first phase of the canal enterprise would most likely have been deciding where to build it.[86] Clearly, the canal had to extend to the lake, but the exact course would depend on environmental conditions such as the incline of the land and natural obstacles. The Spaniards' unfamiliarity with the terrain meant that determining the precise location almost certainly fell to the Tetzcocans. As masters of their own land, Ixtlilxochitl and his experts in planning and building hydrologic projects would have known the best places to dig so as to avoid natural impediments. After some deliberation, it was decided that the canal would be constructed along a narrow, shallow stream that flowed

86. The precise physical location of the canal has sparked some debate. See Ramón Cruces Carvajal, "Construcción de un canal de Texcoco para botar los bergantines de Hernán Cortés Año 1529," *Revista Mexicana de Ciencias Agrícolas* 2 (2015): 481–486; Celso Ramírez Torres, "Ubicación del sitio donde fueron botados los bergantines de Cortés," *Consejo de la Crónica Municipal de Texcoco* (July 15, 2019); and Ernesto Sánchez Sánchez, "El sitio de los bergantines de 1521 en Texcoco: una revision bibliográfica de su ubicación," in *Texcoco en el Tiempo* 002 (April 2021), https://www.texcocoeneltiempo.org/category/publicaciones/articulo/, accessed October 18, 2023.

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in the direction of the lake.[87] The rivulet, according to Native author Alva Ixtlilxochitl, cut through the gardens and palaces of his illustrious ancestor Nezahualcoyotl, and continued alongside the houses of Tetzcoco residents as it rushed toward the lake.[88]

The main objective was to deepen the stream bed, not an easy task.[89] The stream's course sloped slightly, and stretched well over a mile towards the lake.[90] The composition of the land, comprised of innumerable rocks and stones, would create no shortage of obstacles for the diggers. There was no way to circumvent the larger stones and keep to the intended course, so they would need to be extracted from the earth or broken into smaller pieces using picks and mallets. Given these obstacles, and the length of the canal, the excavation would be an unenviable task.

In terms of labor, the actual digging of the canal may have been the most impressive Native accomplishment of the entire war. The proposed dimensions of the 9,100-foot canal were 12 feet (3.7 meters) wide and equally deep. This plan would have required the excavation of roughly 1,310,400 cubic feet of earth (37,106 cubic meters).[91] To put that figure in today's perspective, the excavation effort would equal the construction of roughly 15 Olympic-size swimming pools.[92] This was a massive amount of earth to dig, and demanded the cooperation of large numbers of Native collaborators. According to several early sources, 400,000 Native people from Tetzcoco and Culhuacan were pressed into work on the canal project.[93] However, some historians question

87. According to Chimalpahin, a pre-existing irrigation canal was chosen as the basis to build the ditch. While certainly plausible, this contradicts the accounts of various others, including Cervantes de Salazar, Torquemada, and Fray Francisco de Aguilar, who state that a stream bed was used as the foundation for the canal. Chimalpahin, *Chimalpahin's Conquest*, 308; Cervantes de Salazar, *Crónica*, Book 5, chapt. 72; Torquemada, *Monarquía indiana* (1975), vol. 2: Book 4, chapt. 85, 259; and Aguilar, *Relación breve de la conquista de la Nueva España* [1571] (Mexico City: UNAM, Instituto de Investigaciones Históricas, 1977), 95.

88. Alva Ixtlilxochitl, *Obras históricas*, 2:416: "por traza y orden de Cortés, mandó hacer Ixtlilxochitl una zanja profunda que tenía más de media legua de longitud, con la profundidad necesaria, que corría desde dentro de los jardines y palacios del rey Nezahualcoyotzin su abuelo, hasta dentro de la laguna."

89. Cervantes de Salazar, *Crónica*, Book 5, chapt. 72. Fray Francisco de Aguilar, a member of the Cortés expedition, confirmed the widening and deepening of the rivulet: "se hizo una acequia honda por un arroyo que iba hasta la laguna." Aguilar, *Relación breve de la conquista*, 95.

90. Carvajal, "Construcción de un canal," 484.

91. Cortés indicates in his letter to the crown that the canal measured 12 feet wide and 12 feet deep. Ixtlilxochitl largely confirms these dimensions: "It was over a half league long and twelve or thirteen feet wide and more than twelve feet deep." Cortés, *Letters from Mexico*, 206; and Alva Ixtlilxochitl, *Native Conquistador*, 36. The amount of earth excavated is based on my own calculations: length (9,100 ft) x width (12 ft) x height (12 ft). This number roughly corresponds to the calculations of Carvajal, who estimated the removal of 32,928 cubic meters of earth (1,162,841 cubic feet). "Construcción de un canal," 483.

92. This calculation is based on the standard dimensions of a Olympic-size swimming pool, approximately 164 feet long, 82 feet wide, and 6.5 feet deep (87,412 cubic feet).

93. Cervantes de Salazar and Alva Ixtlilxochitl both assert that 400,000 Native people labored on the project. Salazar, *Crónica*, Book 5, chapt. 104; and Alva Ixtlilxochitl, *Native Conquistador*, 36.

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this number/ believe that this number was a numerical exaggeration, and believe that 40,000 workers were instead employed in total.[94] The latter figure is a more reasonable estimate, considering that the population of Tetzcoco prior to the arrival of the Spaniards was believed to be around 24,000.[95] Even so, this was an immense Native labor force, nearly doubling the 20,000 to 30,000 workers believed to have labored on the Great Pyramid of Giza over the course of its construction.[96]

The sources generally agree that Native diggers worked in relays of 8,000 to 10,000 each day, for 50 days consecutively.[97] Such an extensive mobilization of workers reflects in large part Ixtlilxochitl's adept political leadership. Only a lord of his stature, and one who commanded deep reverence amongst his subjects, could have organized his vassals into such waves of labor and sustained the effort for seven weeks. While undeniably impressive, this sort of labor mobilization was a timeworn tradition in the Basin of Mexico, where local rulers regularly commissioned engineering and waterworks projects of this nature and had long known how to organize their vassals for such occasions.[98] This is not to say, however, that Ixtlilxochitl is to receive all of the credit for the enterprise. The Native sovereign dealt with all the broader affairs of his province, and could not be present at all times to manage the canal enterprise. For this reason, supervision of the ongoing labor would have fallen to trusted supervisors and overseers. From the edges of the canal, Native foremen would convey the engineering scheme to the excavators, and otherwise ensure that the work was carried out correctly. The diggers in turn worked diligently to extract the earth, understanding the gravity of the task at hand and the need to execute it in speedy fashion. In this manner the excavation process became a completely collaborative affair, with various echelons of Native society (the tlahtoani, the overseers, and the diggers) all playing crucial roles.

94. Gardiner and Hassig claim 40,000 Tetzcocans labored on the canal. Gardiner, *Naval Power*, 125; and Hassig, *Mexico and the Spanish Conquest*, 147. While the Tlaxcalteca may have had a part in its construction, the fact that the witnesses in the *Interrogatorio de Tlaxcala* do not allude to such participation suggests that they probably did not assist in the excavation process, or perhaps played a minor role.

95. Michael E. Smith, "City Size in Late Post-Classic Mesoamerica," *Journal of Urban History* 31:4 (May 2005): 403–434, esp. 411.

96. Mark Lehner, *The Complete Pyramids* (London: Thames and Hudson Ltd., 1997), 224; Miroslav Verner, *The Pyramids (New and Revised): The Archaeology and History of Egypt's Iconic Monuments* (Cairo: American University in Cairo Press, 2021), 396.

97. On this work, Cortés wrote: "More than eight thousand natives from Aculuacán and Tesuico (Tetzcoco) provinces worked for fifty days on this task." Ixtlilxochitl remarked that "[i]t took fifty days . . . they worked in shifts of 8,000 or 10,000 each day." Cervantes de Salazar observed: "Eight thousand Indians worked on this project every day, natives of the provinces of Culhuacán and Tezcuco. It took them fifty days to dig the ditch." Cortés, *Letters from Mexico*, 206; Alva Ixtlilxochitl, *Native Conquistador*, 36; and Cervantes de Salazar, *Crónica*, Book 5, chapt. 104.

98. Mundy, *The Death of Aztec Tenochtitlan*, 52. See also Doolittle, "Indigenous Development"; and Doolittle, *Canal Irrigation in Pre-Historic Mexico: The Sequence of Technological Change* (Austin: University of Texas Press, 1990).

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In the end, the key to the canal project may well not have been the huge labor force but rather the engineering feats of the Native people. Once excavated, all the extracted soil had to be relocated. Most of it would have been used to build lateral embankments along the canals to prevent the outflow of water. In addition, the inner walls of the canal had to be reinforced with wood stakes and stone to prevent water seepage.[99] These two engineering concepts, the use of embankments and the stuccoing of the walls, may have been Indigenous ideas. Several decades before the arrival of the Spanish, Mesoamericans had already developed the concept of lining canal walls of canals to minimize erosion and prevent the upturning of the soil.[100] Embankments and other water-control structures such as aqueducts and sluice gates had been utilized in Mesoamerica for over a thousand years.[101] Given the lengthy history of managing water in the region, it is plausible that Ixtlilxochitl—or one of the other Indigenous lords supervising the project—had more to do with the selection and placement of these structures than did any of the Spaniards who came from arid regions of Spain, such as Extremadura, New Castile, or southeastern Andalusia.

As Native laborers dug the canal and others assembled the brigantines, Indigenous auxiliaries played important roles. For approximately seven weeks, cooks had to feed the 8,000 to 10,000 workers who labored on the excavation each day. Although Indigenous women seldom appear in the historical record from this period, large numbers of women would have been busy cooking to feed the workforce so that operations ran efficiently and on schedule.[102] Also needed were interpreters: language barriers between Spanish workers and their Native colleagues at the shipyard meant that Indigenous translators had to be present to communicate and relay instructions, such as how to join the planks, fashion the oars, and help mount the guns.

On at least one occasion, this responsibility would have fallen into the hands of the Castilians' Native interpreter and adviser Malintzin, a significant figure in the conquest.[103] Besides cooks and translators, Native warriors, spies, and scouts stood ready to defend the shipyard in case of a surprise assault.[104] The significance of this group was made apparent when the Mexica made at least

99. Schroeder et al., *Chimalpahin's Conquest*, 308.

100. Doolittle, "Indigenous Development," 310.

101. Doolittle, *Canal Irrigation in Pre-Historic Mexico*, 65; Doolittle, "Indigenous Development," 311–316.

102. Aside from feeding the workers, Native women would have played other important roles in the naval enterprise, including transporting materials across the land, or interpreting to help communicate information to the Spanish. For a rich collection of essays that treats the lives, experiences, and roles of Indigenous women in pre-Hispanic and colonial Mexico, see Susan Schroeder, Stephanie Wood, and Robert Haskett, eds., *Indian Women of Early Mexico* (Norman: University of Oklahoma Press, 1997).

103. For the role of this figure in the conquest, see Townsend, *Malintzin's Choices*.

104. Díaz del Castillo confirms the presence of spies, scouts, and guards in the shipyard to protect the vessels. *Discovery and Conquest*, 354.

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three attempts to sabotage the shipyard between February and April of 1521. In one instance, the Mexica launched a night raid to burn the unfinished vessels; however, the joint Indigenous-Spanish forces repelled the attackers and captured 15 enemy warriors.[105] Without the presence of these Native combatants, it is plausible that the ships might have been burned or otherwise destroyed. At the very least, the unbridled/continued harrassment of Mexica saboteurs would have delayed the completion of the ships and pushed back the timetable of the final siege. In the end, no significant calamity befell the program, and by late April 1521, the ships were ready for launch.

INTO THE LAKE: RELEASE THE DAMS, LAUNCH THE SHIPS

With the brigantines finished, and the ditch excavated, there remained one final task: to raise the water levels of the gigantic canal. It was April, the end of the dry season, and the rivulet on which the canal was built would at that time have been quite shallow. Given that there was not enough water to float the vessels to the lakeshore, a series of dams (*presas*), 12 in all, were constructed at strategic points along the 1.73 mile stretch to impound more water into the ditch.[106] As those dams were released, the water that rushed into the channel would not only raise its level but also generate a faster-moving current, thereby facilitating the movement of the ships into the lake.

We can reasonably assume that the construction of the dams fell into the hands of the Tetzcocans. The residents of the lakeshore *altepetl,* having grown up in and around the small pools and lakes within the Valley of Mexico, made up a highly sophisticated lacustrine community that knew how to harness and modify the watery landscape. The Tetzcocans were also familiar with the water sources nearest to where the dams had to be built. The Spanish, by contrast, had little knowledge, if any, of the surrounding topography. They were also occupied with other preparations for the final siege, and were otherwise far too few in number to erect a single dam, let alone a dozen of them.

After the 12 embankments were raised, the brigantines were docked in one of the dammed reservoirs and tethered in place by a series of ropes. When the time was ready to launch them, the dam was to be released, allowing the vessels to drop one

105. Díaz del Castillo, *Discovery and Conquest*, 354.

106. Cervantes de Salazar, *Crónica*, Book 5, chapt. 72; and Torquemada, *Monarquía Indiana* (1975), vol. 2: Book 4, chapt. 85, 259. Because the canal was connected to Lake Texcoco, the water from the lake would have poured into the stream bed and helped to fill the massive ditch. However, since the canal traversed a slightly elevated slope, the water from the lake would have filled the channel only partially, and apparently unevenly, hence the need for additional water. Carvajal, "Construcción de un canal," 484–485.

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by one into the canal, where they would eventually float into the lake. Based on the account of Cervantes de Salazar, the trickiest part of the brigantine launch did not appear to be impounding water into the canal, but the actual release of the armada into the artificial waterway. Given the considerable force of the current generated by the release of the dam, there was genuine concern that the ships might break upon impact with the water, or equally worrisome, collide into one another. Eight long months had been consumed in the construction of the ships. If they were to be damaged, or destroyed, the conquest of Tenochtitlan would be immeasurably more difficult, if not implausible. Therefore, when the much-anticipated time came to release the vessels, on April 28, 1521, the entire Spanish and Indigenous force assembled on the lakeshore to bear witness.[107]

In the anxious moments leading up to the launch, the Christians celebrated mass on the waterfront, saying "many prayers" for the safe passage of the vessels into the lake. The Spanish priest, Friar Bartolomé de Olmedo, went over to the dam where the brigantines lay, sanctifying the ships with holy water and invoking the favor of the Virgin Mary to protect them. Once these Christian rituals were complete, "a signal was made to release the dam," writes Cervantes de Salazar, upon which "the brigantines left with great fury." With the aid of an improvised slide (*deslizadero*), as well as other mysterious "inventions and ingenuities" to which the chronicler makes reference, the ships dropped into the canal one by one, and moved into the lake without any reported damage.[108] As those brigantines floated in the lake, unscathed, shouts of exultation burst forth from Spanish and Native people alike, and celebratory music and cannon fire rang out. The outpouring of emotion was more than understandable, especially if we consider the huge effort invested in the project and the perceived significance of the vessels to the winning of the war.[109] Now in possession of a fleet of powerful warships, the besiegers at last controlled a formidable navy with which to dominate the lake waters surrounding Tenochtitlan—one that if deployed to maximum effect could help reduce its walls and parapets to rubble. And when the time came for battle, the brigantines constituted one of the more important factors in the final siege (see Figure 8).

Broadly speaking, the ships accomplished three important goals of the Spanish war effort: they increased Spanish mobility on the lake, allowing their forces to

107. Cervantes de Salazar, *Crónica*, Book 5, chapt. 72.

108. Cervantes de Salazar, *Crónica*, Book 5, chapt. 72. Torquemada also points to the use of a slide: "In the part of the last dam a slide was made using stones, so that upon releasing the dam, the brigantines, although with great fury, would hit the lagoon one after the other without danger." *Monarquía indiana* (1975), vol. 2: Book 4, chapt. 85, 259.

109. In his third letter to Emperor Charles V, Cortés referred to the brigantines as "the key" to conquering Tenochtitlan. *Letters from Mexico*, 212.

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FIGURE 8
The Final Siege of Tenochtitlan, May to August 1521

Source: Two brigantines sail on Lake Texcoco, and contend with the Mexica's fleet of canoes for supremacy of the lake. Mounted in the bow of each craft are high-powered guns, which could reportedly sink a canoe with a single shot. Bernardino de Sahagún, *General History of the Things of New Spain*, also called the *Florentine Codex (1577)*, Book 12, chapt. 30, fol. 56. Manuscript held in the Medicea Laurenziana Library, Florence, Med. Palat. 220, fol. 463r. Courtesy of the MiC. Any further reproduction by any means is prohibited.

land at strategic points in the Basin of Mexico; they augmented and amplified one of the Spaniards' greatest tactical advantages, artillery, by affording its placement on the decks of the ships; and they enabled the Indigenous-Spanish coalition to effect a naval blockade of the city, cutting the island off from food and water

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supplies.[110] For these reasons, among others, the writings of colonial and modern historians are filled with references to the powerful effect of the brigantines, but it is worth emphasizing that the main participants in the war (the Spanish and the Native peoples themselves) also recognized their significance.

In the 1565 interrogatory compiled by the Tlaxcalteca, every witness concluded their testimony by asserting that the ships were one of the principal reasons for the toppling of the city of Tenochtitlan. In the words of one witness: "los dichos vergantines fue una de las mas principales caussas por donde se gano la ciudad."[111] Cortés, no doubt, would have agreed. In his third letter to *Charles I of Spain (Holy Roman Emperor Charles V)* in 1522, he referred to the ships categorically as "the key to the war."[112] While his adversaries, the Mexica, never went so far as to attribute the downfall of Tenochtitlan to the brigantines, they did acknowledge the havoc wrought by the vessels. In Book 12 of the *Florentine Codex*, which documented the Spanish-Aztec War from the viewpoint of the vanquished, the Mexica recorded the devastation of the brigantines in the canals of the city: "The two boats [of the Spaniards] went along contending with the war boatmen; there was skirmishing in the water. A gun went in the prow of each of their boats, and where the [Mexica] boats were close together and assembled, they fired on them; many people died from it." When hit, each boat "quickly lifted its prow, wavered, and sank."[113] That

110. On the impact of the ships, see Prescott, *Conquest of Mexico*, Book 6, chapt. 5, 741–761; Gardiner, *Naval Power*, 196–200; and Hassig, *Mexico and the Spanish Conquest*, 158–161. The brigantines, however, were not unbeatable war machines. Given their considerable size, they were largely confined to the deeper waters of the lake and could not pursue Mexica canoes into the shallower areas. Second, the Mexica recognized the powerful advantage of the ships and made concerted efforts to neutralize them, such as constructing stakes on the lake bed to try to ground them. Third, because the ships were relatively easy targets, their safety hinged largely a barrier consisting of thousands of canoes rowed by their allies to form a protective barrier against the Mexica fleet. Fourth, the numerous dikes built in Lake Texcoco, such as the great Dike of Nezahualcoyotl, hindered the overall mobility of the brigantines; it would be necessary to breach the dikes, under protection of cannon fire, to enter certain areas of the lake. Hassig, *Mexico and the Spanish Conquest*, 158–161; Donald E. Chipman, *Sword of Empire: The Spanish Conquest of the Americas from Columbus to Cortés, 1492–1529* (Kerrville, TX: State House Press, 2021), 222–224.

111. Testimony of Francisco Montaño, Interrogatory and Testimony, 1565, AGI, Patronato 74, N.1, R.13: "the brigantines were one of the main reasons by which the city was won." Another witness, Álvaro de Sandoval, made a similar acknowledgement: "the brigantines were the main reason for the conquest of the city of Mexico" (*los dichos vergantines fue la principal cosa para la conquista de la dicha ciudad de Mexico*). A third testimony, from Alonso Soltero, stated that the brigantines were one of the most significant contributions "that was made to the royal crown of Castile, and worthy of a very large reward and remuneration because it led to the capture of the city of Mexico" (*que se hizo a la rreal corona de castilla y digno de muy gran premio e rrenumeracion porque se siguio dello tomarse y ganarse la dicha ciudad de México*).

112. Cortés, *Letters from Mexico*, 212: "the key to the war lay with them. . . . As the wind was good, we bore down through the middle of them, and although they fled as fast as they were able, we sank a huge number of canoes and killed or drowned many of the enemy, which was the most remarkable sight in the world."

113. Sahagún, "Book Twelve of the Florentine Codex," in Lockhart, *We People Here*, 188. The *Florentine Codex* (also known as the *General History of the Things of New Spain*) was an encyclopedic history of Nahua culture compiled by the Franciscan friar-ethnographer Bernardino de Sahagún between 1545 and 1575. Under Sahagún's supervision, the text was produced in partnership with noble Indigenous elders from various towns in central Mexico as well as Nahua students from the Colegio de Santa Cruz de Tlatelolco. The compilation process involved two steps: the elders first answered a set of questions about their religion and culture and recorded the answers using pictographs.

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FIGURE 9
"Puente de los Bergantines," Texcoco, c. 1904

Source: Photograph, Fototeca Nacional, C. B. Waite/W. Scott Collection, National Institute of Anthropology and History, Mexico City. SecretarÍa de Cultura/INAH/MEX. Reproduction authorized by the Instituto Nacional de Antropología e Historia.

participants on both sides of the struggle called attention to the impact of the brigantines is revealing: it suggests that they perceived the vessels, and by extension, the shipbuilding program, to be one of the most noteworthy—if not the most critical—aspects of the entire war.

CONCLUSION

In 1875, the municipal authorities of Texcoco unveiled a commemorative obelisk standing over 15 feet tall, to commemorate the launching of the brigantines in 1521. The obelisk is referred to as "Puente de los Bergantines" (see Figure 9).

Constructed on the supposed launching grounds of the vessels, the monument bears a small expository plaque at the top: "Bridge of the Brigantines, where Cortés launched the ships for the capture of the Aztec Capital, April 5,

Sahagún's Nahua students then interpreted the illustrations and elaborated on the answers, transcribing them into Nahuatl using the Latin alphabet. The full text is divided into 12 books, the last of which is concerned with the fall of Tenochtitlan.

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FIGURE 10
"Puente de los Bergantines," Texcoco, 2022

Source: Photo by Andrea Chacón (16 November 2022). For local residents steeped in the history of the region, the obelisk may serve less as a reminder of the Spanish victory than as a testament and celebration of the contributions and engineering feats of their Indigenous ancestors.

1521."[114] A careful observer might detect one of the mistakes that riddles the slab —the ships launched on April 28, not April 5. But a second error, and a more subtle one, is that the land on which the monument sits was not the site of a *puente* (bridge) at all, but a once-bustling shipyard.[115] Here, thousands of Native people assembled in the winter and spring of 1521 to construct 13 ships and an enormous canal with which to conquer the city of Tenochtitlan. While the commemorative tablet captures the culmination of the enterprise, it fails to acknowledge that it was Native people, and not Cortés, who largely made it

114. In Spanish: "*Puente de los bergantines donde Cortés botó las naves para la toma de la capital Azteca, 5 de Abril de 1521*."

115. According to the eighteenth-century observer Francisco Antonio Lorenzana, the lime and stone remnants near the shipyard in Texcoco resembled what appeared to be a bridge: "efta Azequia, donde fe echaron los Bergantines, eftá junto á Tezcuco, y fe ve hoy como un Puente." It is perhaps for this reason that the local residents commonly referred to the launching grounds as a *puente*, rather than an *astillero* (shipyard). Lorenzana, *Historia de Nueva España*, (Mexico City: Imprenta del Superior Gobierno del Br. D. Joseph Antonio de Hogal, 1770), 234. This description from Lorenzana was brought to my attention when I read Sánchez's piece, "El sitio de los bergantines de 1521 en Texcoco."

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possible. With that said, we cannot fault the municipal authorities of Texcoco for missing this information. The monument was erected at a time when Indigenous sources were still largely undiscovered, and the full extent of Native participation in the Spanish-Aztec War was far from recognized. Even to this day, little is known about the great naval project of 1520-21, and particularly little about the roles of the Native peoples who stood at its vanguard.

This article has sought to recover this long-neglected story. Credit for the success of the naval program tends to go mostly, if not completely, to the Spanish. I have attempted to demonstrate how the main drivers of the project were the Spaniards' Native allies. Over the course of eight months, scores of Indigenous people from Culhuacan, Chalco, Cholula, Huejotzingo, Tetzcoco, and Tlaxcala came together to cut trees, saw timbers, carve wood, transport logs, assemble planks, and dig out the massive canal.

Such labor was critical to the enterprise. However, I argue that its success hinged not only on Native muscle, but also on Indigenous knowledge of the local environment and Native concepts of hydraulic engineering.[116] Through generations of living in and around the Basin of Mexico, the Native peoples had built a rich repository of ecological and hydrological knowledge about their surroundings. When the ship and canal building program unfolded in their backyards, the Indigenous peoples drew on this reservoir of knowledge to help ensure its success in every phase, from collecting local materials to build the ships, determining the precise location of where to place the canal, and executing some of the project's finer engineering aspects, such as lining the walls of the ditch or erecting lateral embankments. It was this knowledge and expertise, together with extensive labor services, that made the Native people the true masters of the naval enterprise.

As for the commemorative monument in Texcoco, erected nearly 150 years ago, it would be remiss not to report that to this day it stands on Calle Juárez Sur in the southern part of the city, largely overlooked amid the urban sprawl (see Figure 10).

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116. The term "hydraulic engineering" in this context is adopted from Candiani, *Dreaming of Dry Land*, 16.

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