

“A Wet, Nasty Job”: Army Engineers and the Nicaragua Canal Survey of 1929–1931

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Among the great themes in the maritime history of the world, the fascination with creating a pathway connecting the Atlantic and Pacific Oceans looms especially large. The search for such a pathway went beyond nautical concerns. It came to have diplomatic, military, economic, and scientific significance. The Western powers sought to tap the riches of the East, spread their influence over the Pacific and Asia, and facilitate trade and travel between America’s West Coast and Europe.

The dream of a passage between the seas eventually materialized as the Panama Canal, built by the United States and completed in 1914. A quick glance at a map suggests that building the canal through the Isthmus of Panama was the logical

choice. A closer look at the map shows that there were several other possibilities. The historical record shows that in the United States advocates of a canal across Nicaragua dominated the debate for many years, and that the United States was far from alone in its desire for a corridor linking the great oceans.



Diamond drill crew at Miramar lock site, December 18, 1930. Diamond drills were used to obtain rock strata samples.

Since the early colonial era in the Western Hemisphere, Spain, Britain, the Netherlands, France, and the United States all investigated possible routes for highways, railroads, and canals. Throughout the 19th century, governments, commercial interests, and individuals considered as many as 19 possibilities, ranging from the Isthmus of Darien, in what is now Colombia, to the Isthmus of Tehuantepec in Mexico.¹ During this period, the American government favored a route through Nicaragua. This article examines the Army’s survey of 1929–31

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¹ W. W. Rasor, “The Nicaragua Canal: Its Four Centuries of Luring to the Old World Nations and for a Hundred Years the Dream of American Engineers,” *Pan American Magazine* 42 (Apr. 1930): 392–98.

that gathered a great deal of important information for that possible route. The survey and its reports remain a rich source of information about that region and its people.

Background

American interest in Nicaragua had a long history. In 1826, the American secretary of state instructed the chargé d'affaires in the new Federal Republic of Central America to transmit information about prospective canal sites. Army engineers became involved in 1839 when an officer of the Corps of Topographical Engineers estimated the amount of material that needed to be excavated for a canal in Nicaragua. (The Corps of Topographical Engineers existed separately from the Corps of Engineers from 1838 to 1863.) The acquisition of California by the United States in 1848 and mineral strikes there the following year stepped up demands for a quicker, safer way for interoceanic travel and shipping. An American-built railroad across the Isthmus of Panama was completed in 1855; topographical engineer Bvt. Lt. Col. George W. Hughes had surveyed its roadbed.² Interest in a canal, however, continued.

Orville Childs, an American acting for Cornelius Vanderbilt's American Atlantic and Pacific Ship Canal Company, explored the neck of land between Lake Nicaragua and the Pacific from 1850 to 1852. His report recommended a Nicaragua canal. In the Clayton-Bulwer Treaty of 1850, the United States and Great Britain agreed to joint control of any canal to be built in Nicaragua or, by implication, any other country in Central America.

From the 1850s to the end of the century American army engineers, naval officers, and civilian scientists and engineers conducted surveys throughout Central America. For example, topographical engineer Lt. Nathaniel Michler submitted a report on the possible route he explored through the Isthmus of Darien, 1857–1858.³ The resulting reports of the various surveys contained a wealth of data on rivers, lakes, harbors, weather, terrain, geology, natural history, and human inhabitants, as well as maps, charts, and images.

Few Americans were more desirous of a canal between the oceans than Ulysses S. Grant, who, as a junior officer in 1852, had struggled through the Isthmus of

² Jon T. Hoffman, Michael J. Brodhead, Carol R. Byerly, and Glenn F. Williams, *The Panama Canal: An Army's Enterprise* (Washington, DC: Center of Military History, 2009), 3.

³ *Survey for an Interoceanic Ship Canal Near the Isthmus of Darien*, 36th Cong., 2nd sess., 1861, S. Ex. Doc. No. 9, 1861.

Panama en route to California with his regiment. During his presidency, seven expeditions examined Central America for possible canal routes.⁴

In 1876, a French naval lieutenant, Louis Napoleon-Bonaparte Wyse, secured from the government of Colombia (formerly New Granada) an agreement that granted the company he represented a concession to build a canal through the republic, which included the province of Panama. Wyse’s concession was transferred to the syndicate headed by Ferdinand de Lesseps, builder of the Suez Canal and now determined to construct a sea-level canal through Panama.⁵ His efforts there proved disastrous.

Throughout the period of searching for a location for a canal the Americans were inclined to favor a Nicaraguan route. There was general agreement that such a waterway should run from San Juan del Norte (called Greytown by the Americans and British) on the Caribbean side, through a canalized San Juan River to Lake Nicaragua; from the lake to the narrow neck of land down which the Continental Divide ran; through the divide along Rio Grande; and on to Brito on the Pacific Coast.⁶ The huge lake would provide a natural waterway for much of the proposed route, thus reducing many miles of digging, dynamiting, and dredging. There was also a consensus favoring a lock canal rather than one at sea level.

An American firm, the Nicaragua Canal Association, formed in 1887, quickly went defunct, and its successor, the Maritime Canal Company of Nicaragua, did little better; it ceased operations in 1893 after the company had constructed 12 miles of railroad and excavated one mile for a canal.⁷ President William McKinley appointed a Nicaragua Canal Commission in 1897. Chaired by Rear Adm. John G. Walker, its other members included Army engineer Col. Peter C. Hains and Lewis

⁴ Among the more important ones were the naval investigations of a Darien route led by Comdr. Thomas O. Selfridge and an examination of the Isthmus of Tehuantepec under Capt. Robert W. Shufeldt; Maj. Walter McFarland of the Army Corps of Engineers conducted a reconnaissance for a Nicaragua route. In 1880, as a private citizen, Grant published an article in the *North American Review* in which he championed a canal through Nicaragua. Grant, “The Nicaragua Canal,” *North American Review* 132 (February 1881), 107–16. The article was reprinted as S. Doc. No. 207, 57th Cong., 1st sess., 1902.

⁵ McCulloch, *Path Between the Seas: The Creation of the Panama Canal* (New York: Simon and Schuster, 1977), 61–67.

⁶ United States Army Interoceanic Canal Board, *Message from the President of the United States Transmitting Report with Appendices and Maps of the Chief of Engineers, United States Army, and the Interoceanic Canal Board*, 72nd Cong., 1st sess., 1932, H. Doc. 139, 1931, 54, (hereinafter cited as *ICB Report*); *ibid.*, 55.

⁷ *Ibid.*, 55–56. A federally chartered corporation lent the prestige of the government to a private enterprise without making the government financially liable.

M. Haupt. The canal commission's report of its survey of 1897–99 recommended the San Juan del Norte-Lake Nicaragua-Brito route.⁸

The American Canal in Panama

The Isthmian Canal Commission, also headed by Walker, came into being in 1899. The commissioners were willing to consider routes other than in Nicaragua only. Hains and Haupt were among the nine members of the new commission; they were joined by engineer Lt. Col. Oswald H. Ernst. The Commission examined potential routes in Nicaragua and Panama.

The Compagnie Nouvelle du Canal de Panama, successor to the French company that, under de Lesseps, had begun construction of a canal in Panama in 1880, was struggling and showing signs of willingness to sell its assets to the United States. But the Commission recommended Nicaragua, primarily because the French offered to sell for \$109 million, a figure that the Americans believed to be too high.

When the canal company lowered the purchase price to \$40 million the Commission reversed its earlier conclusion and recommended the Panama route. The champions of a Panama route eventually prevailed. They argued that a Panama canal would be one-third the length of a Nicaragua waterway, need fewer locks, cost less to operate, and be easier to navigate. Moreover, Panama had good harbors on both the Pacific and Caribbean sides, which Nicaragua did not. The Spooner Act of 1902 authorized the construction of an American canal across the Isthmus of Panama.⁹

A Persistent Dream

With the building of the Panama Canal, it would seem likely that all talk of a Nicaragua passage would cease. Even though the Panama Canal, completed in 1914, has been hailed ever since as a success in every way, dreams of a canal through Nicaragua persisted in the United States and elsewhere. Hopes for a second Central American canal were of course especially high in Nicaragua.

The grand opening of the Panama Canal took place on August 14, 1914. A little over a week earlier, on August 5, the Bryan-Chamorro Treaty was signed, giving the United States the right to build, operate, and maintain a canal through Nicaragua.

⁸ Ibid., 54–55; McCullough, *Path Between the Seas*, 274; *Report of the Nicaragua Canal Commission, 1897–1899* (Baltimore: The Lord Baltimore Press, 1899), 45–46.

⁹ Hoffman et al., *Panama Canal*, 7–8.

In return, the United States paid the Nicaraguan government \$3 million, to be used for paying off its foreign debt. Nothing was done immediately, but interest in a water passage through Nicaragua remained strong over many years.

A second canal was thought desirable for several reasons. The increasing size of naval and commercial vessels would eventually require a canal wider than the one in Panama. Also, the predicted increase in shipping would call for another Central American passageway. In case of war, an enemy might have difficulty attacking or sabotaging two canals, and American naval vessels could pass from coast to coast in less time than if they went through Panama. Since Nicaragua was closer to the United States, a transit through Nicaragua could save time and money, even though a canal there would be longer than the Panama route. A second canal would further benefit economic interests on America’s East, West, and Gulf coasts and in the Mississippi Valley, and shorten the distance between the West Coast and Europe and the east coast of South America. A canal in Nicaragua would promote political stability, which would in turn provide a safer environment for other American interests there. Proponents of a Nicaragua route also contended that such a project would cement better relations between the United States and all of Central America.¹⁰

The Survey of 1929–1931 is Formed

By 1928 interest in a second canal or a third set of locks for the Panama Canal was strong enough to produce a resolution in Congress authorizing a survey of Nicaragua in order to bring the 1901 data up to date and to examine the feasibility of an additional set of locks for the Panama Canal and of converting it to a sea-level canal. The legislation appropriated \$150,000 to fund the work. The Nicaragua survey was to be carried out under the direction of the Secretary of War and the supervision of the Army’s Chief of Engineers, assisted by an Interoceanic Canal Board (ICB). The resolution authorizing the project allowed



Lt. Col. Daniel I. Sultan, officer in charge of the Nicaragua Canal Survey.

¹⁰ W. W. Rasor, “The Economic and Strategic Importance of the Nicaragua Canal: Some of the Benefits to Accrue to Sea-borne Commerce Via Nicaragua As Against Transit Via Panama,” *Pan American Magazine* 42 (Apr. 19, 1930), 299–402. *ICB Report*, 13–19. For opposing arguments, see John F. Stevens, “Is a Second Canal Necessary?” *Foreign Affairs* 8 (Apr. 1930), 417–29. Stevens had been the second chief engineer on the Panama Canal.

for the hiring of civilian engineers to assist the Army engineers. The examinations in Panama were made the responsibility of the Governor of the Canal Zone.¹¹

The Chief of Engineers, Maj. Gen. Lytle Brown, selected Maj. (soon Lt. Col.) Daniel I. Sultan, an experienced and capable officer and a 1907 graduate of the U.S. Military Academy, to lead the survey in Nicaragua. President Hoover also appointed him to the ICB. The surveying was to be undertaken only by officers and men of the Army Corps of Engineers; the limited funds appropriated did not make the hiring of American civilians feasible. The Secretary of War ordered the creation of a provisional unit, to be known as the “United States Army Engineer Battalion in Nicaragua.” When formed, it consisted mainly of one company each from the 1st and 11th Engineer Regiments and the 29th Engineer Battalion (Topographic), along with a Headquarters and Service platoon. Other personnel included detachments from the Quartermaster and Signal Corps and the Medical and Finance Departments. The battalion numbered 25 officers and 295 enlisted men.

In later life, retired Maj. Gen. Kenneth D. Nichols reflected on his service on the canal survey as a second lieutenant recently graduated from West Point and the battalion’s assistant supply officer. He remembered the enlisted men as a “rough collection” that included a soldier who had killed a man with a meat cleaver and someone who had lost his sergeant’s stripes because he threw another sergeant out of a window. Nevertheless he spoke appreciatively of the noncommissioned officers who gave him valuable guidance in Nicaragua.¹²

Lt. Col. Sultan arrived at Corinto, on Nicaragua’s west coast, on August 29, 1929, along with the provisional battalion’s Company C, formed from Company F of the 11th Regiment. They had sailed from the regiment’s base in the Canal Zone in the *U.S. Grant*. U.S. Marine Corps vessels and the American Navy’s USS *Denver* transported them and their equipment and supplies from the *Grant* to the shore.

¹¹ Senate Joint Resolution No. 117, *Statutes at Large*, 1929, 1539–1540; Senate Committee on Interoceanic Canals, *Authorizing an Investigation and Survey for a Nicaraguan Canal as well as Increasing the Facilities of the Panama Canal*, 70th Cong., 1st sess., 1928, S. Rept. 771; Senate Committee on Appropriations, *Investigations and Surveys for a Nicaraguan Canal*, 70th Cong., 2nd sess., 1929, S. Doc. 237; Senate Committee on Appropriations, *Investigation and Survey for a Nicaraguan Canal*, 70th Cong., 1st sess. 1928, S. Doc. No. 145; Senate Committee on Interstate and Foreign Commerce, *Investigation and Survey for Additional Locks at Panama Canal and for a Nicaraguan Canal*, 70th Cong., 2nd sess., 1929, H. Rept. No. 2774.

¹² Interview with Maj. Gen. Kenneth D. Nichols, by Lawrence H. Suid, April and May 1981, Dickerson, MD, 18–21, Research Collection, Oral History Collection, U.S. Army Corps of Engineers, Headquarters, Office of History (CEHO), Alexandria, VA.

President Calvin Coolidge had sent Marines and naval vessels to Nicaragua in 1927 to sustain the government of President Adolfo Díaz, whose Conservative Party’s army was battling the forces of the Liberal Party, and to protect American citizens and American interests, including canal rights. By the time the Engineers arrived, the Marines were supporting the republic’s efforts to suppress the rebellion of Gen. Augusto Sandino (whose adherents were, in the eyes of the canal survey’s officers and other Americans in Nicaragua, “bandits”).¹³

The Work Begins

From Corinto the Engineers traveled by rail to Granada, on the northwest coast of Lake Nicaragua, and there established the survey’s headquarters at the old monastery of San Francisco. It was, wrote Sultan, “a large, rambling structure composed of a number of patios surrounded by corridors and numerous rooms” and “well suited for the purpose of the survey.”¹⁴

From Granada a platoon of Company C traveled across Lake Nicaragua on the steamer *Victoria* to Fort San Carlos, on the southeastern tip of the lake. From there a launch transported them along the San Juan River to Ochoa, where they established Camp Hoover, which served as the company’s headquarters. Leaving a detachment at Granada to maintain their headquarters, the remainder of the company moved into the field and established two camps on the San Juan at the mouth of the Machuca and Machado Rivers and another on the San Francisco River.¹⁵

The rest of the battalion, companies A (Company A of the 1st Engineer Regiment) and B (Company A of the 29th Engineer Battalion), and the supporting units sailed from Brooklyn, New York, on the Army transport *Chateau Thierry* and arrived off Corinto on October 24. A Navy transport, the *Henderson*, carrying most of the survey’s supplies and equipment, had preceded the troops to the Nicaraguan west coast. The Army transport *Kenowis* arrived later with additional materiel. The soldiers proceeded to Granada and took up quarters at the monastery.

After the commanders of the two companies conducted reconnaissances, it was decided to send Company B “as rapidly as transportation facilities would permit” to San Juan del Norte, where it arrived on November 22 and established

¹³ Allan R. Millett, *Semper Fidelis: The History of the United States Marine Corps* (New York: Macmillan Publishing Co., 1980), 243, 246.

¹⁴ *ICB Report*, 47.

¹⁵ The brief account of the battalion’s initial movements is found in *ICB Report*, 46–48.

Camp Hurley (named for Secretary of War Patrick J. Hurley) in the buildings of the Maritime Canal Company.¹⁶ The departure of Company A for Brito, on the west coast, was delayed until the beginning of the dry season. When it did move out of Granada, the mud created by the recently concluded rainy season made its overland journey by ox-carts slow and laborious. The company arrived at Brito on December 11 and selected its camp. Thus the survey's geographical organization consisted of the eastern (Company B), central (Company C), and western (Company A) divisions.

Meanwhile, one officer and a few enlisted men went to Fort San Carlos to unload supplies from the *Victoria* and transport them on ponton boats pulled by launches to the base camps of Companies C and B in the valley of the San Juan.¹⁷ The Signal



A suspension bridge over the Rio Grande River at Camp Deakne, constructed by the battalion's Company A.

Corps detachment set up radio stations at Granada, Fort San Carlos, and the base camps. Later, stations were established at camps where the men operated diamond drills. To ensure timely procurement of supplies and equipment, the survey launched radio service connecting its headquarters and Washington, via Panama. Personnel of the medical detachment, headed by Maj. Paul R. Hawley, were stationed at each of the base camps. The Marine Corps Air Squadron provided transportation for seriously ill and injured patients to the survey's hospital facilities at Managua and Granada. Sultan asserted that "The connection with the outside world by

radio, the knowledge that prompt care would be taken of the sick, the weekly supply service, and the excellence of the food furnished by the quartermaster, maintained throughout a high morale among the troops," despite "dismal" surroundings and "arduous" labor.¹⁸

Although no American civilians worked for the battalion, the survey hired Nicaraguan laborers for various tasks, such as driving hired ox-carts and hacking through the tropical vegetation with machetes.

¹⁶ B. B. Talley, "From Corinto to San Juan del Norte," *Military Engineer* 22 (July–Aug. 1930): 349.

¹⁷ *Ibid.*, 350.

¹⁸ *ICB Report*, 48.

The field activities of the survey's three divisions consisted primarily of topographic work, subsurface investigations, and meteorological and hydrological work.¹⁹ Company A finished its topographical examination of the western division by mid-March 1930, after which it did surveys of the proposed canal route from Fort San Carlos southeast to El Castillo, on the San Juan River, and a proposed railroad line between these two points. Completing the work at the end of May, the company returned to Granada. From there, survey parties were dispatched to “run a line of levels from Granada to Tipitapa and to survey the Tipitapa River.”²⁰

Company B rapidly completed its tasks in June 1930, when it connected with Company C at Nicaragua's East Divide. The larger Company C had more territory (the central division) to cover. Its topographical activities spanned an area that included the San Juan River and surrounding lands from El Castillo to San Juan del Norte and the Deseado route where it linked up with B Company at the East Divide. It conducted a “final check of the route of the canal and embankment lines,” concluding the task in October 1930.²¹

All three companies carried out subsurface investigations, mostly for determining favorable sites for locks and dams. The equipment for doing so included earth augers and diamond drills. Sites investigated included the Rio Negro Hills, Campaña Island (in the San Juan River), Cano Josefina, Miramar, Brito, and La Paz.

Meteorological and hydrological work began soon after the arrival of the first survey troops in Nicaragua. The purpose was to examine the water supply and for “determining the features governing navigation.”²² The troops established rain gauging stations at 20 locations, including Granada, Fort San Carlos, Machado, Machuca, and on the San Francisco River. Men of Nicaragua's Guardia Nacional operated 5 of these. Also recorded were the levels of Lake Nicaragua and Lake Managua, evaporation data, stream flow, atmospheric conditions, barometric pressure, fog observations, anemometer readings of wind force and velocity, and tidal observations at San Juan del Norte and Brito. Six privately owned or government-operated stations collected some of the data.²³

¹⁹ *Ibid.*, 49; Talley, “From Corinto to San Juan del Norte,” 350.

²⁰ *ICB Report*, 49.

²¹ *Ibid.*

²² *Ibid.*, 50.

²³ *Ibid.*

The members of the ICB visited Nicaragua in the period February 1–22, 1931. There they inspected “important features all along the proposed route” and conferred with Sultan. When finished, they sailed to Panama to engage in similar activities.²⁴

Adversity

The officers and men of the Nicaragua survey carried out their assignments facing much discomfort and, occasionally, danger. They endured tropical heat and heavy rains. In western Nicaragua there were distinct wet and dry seasons; in the eastern portion of the country, which averaged 255 inches of rain annually, the dry season was scarcely discernible. Wet clothing was an almost constant cause of discomfort. Muddy terrain slowed overland movement of men and equipment, usually by ox-cart, and the jungle growth blocked most of the sunlight. “If you ever go to Nicaragua to help build a canal,” Sultan advised, “get a job on the Pacific side.”²⁵ In a letter to the chief of the Corps of Engineers’ Military Division, Sultan reported that “All field work has been a wet, nasty job for the troops and officers in the field. They have stood up under it in a remarkable way.”²⁶

Other factors making the lives of the survey parties difficult were alligators, scorpions, and “insects by the million,” which included mosquitoes, fleas, and ticks. To prevent malaria, the soldiers were provided with nets for their tents and daily doses of quinine. Many of the country’s snakes were venomous, but there were no serious cases of poisoning thanks to a plentiful supply of anti-snakebite serum.²⁷

Conducting the survey, however, was dangerous work, and two men died in the process. A mine yawl foundered and capsized, causing the death of Pfc. Phillip S. La Bar, either by drowning or by shark attack. The pilot of the yawl, James Baars Roberts, a Nicaraguan civilian, later drowned at the mouth of the Rio Indio.²⁸

²⁴ *Ibid.*, 4.

²⁵ Keryn Ap Rice, “A River Reconnaissance in Nicaragua,” *Military Engineer* 22 (Mar.–Apr. 1930): 119; Daniel I. Sultan, “An Army Engineer Explores Nicaragua: Mapping a Route for the New Canal Through the Largest of the Central American Republics,” *National Geographic Magazine* 61 (May 1932): 593, 599.

²⁶ Sultan to Lt. Col. Robert R. Ralston, Nov. 14, 1930, Records of the Interoceanic Canal Board, box 46, folder 1110, Records of the Office of the Chief of Engineers, Record Group 77, National Archives at College Park, College Park, MD. (hereinafter cited as Records of the Interoceanic Canal Board).

²⁷ Sultan, “An Army Engineer Explores Nicaragua,” 593, 597.

²⁸ *Ibid.*, 597; [Sanitary Report], Records of the Interoceanic Canal Board, box 47, folder 2341.

Plants as well as animals caused problems. Vegetation was often covered with thorns. “But,” wrote Sultan, “the worst plant pest was the picapica, the smart resulting from contact with which lasts for hours and makes one feel as if he were being bitten in a small area by hundreds of ants.” Also causing misery were “Ringworm, screw worm, infected ears, and infections from insect bites or ordinary cuts and abrasions.”²⁹

Humans, too, posed a potential danger to the soldiers. Fortunately for them, the fighting between the Sandino forces and the Marines and Guardia Nacional was taking place in the northern part of the country, far from the proposed canal route. Nevertheless, Sandino had announced that he would never permit the Americans to build a canal in his country, so the survey parties performed



Members of Headquarters Platoon taking lunch on Zapatera Island, joined by 2nd Lt. Benjamin Talley (far left) and his wife.

their work fully armed. According to Sultan, “Sandino poses as the George Washington of Nicaragua, but he is only a cut-throat and a bandit, preying upon foreigners and the law-abiding citizens of his country.” When word came that *Sandinista* forces were planning an invasion of Fort San Carlos from Costa Rica, the battalion’s supply officer at San Carlos requested eight rifles. The weapons were sent—along with two coffins. The threatened raid never materialized, and the coffins were used to store potatoes and onions.³⁰

A greater threat to the soldiers’ well-being was venereal disease. Both gonorrhea and syphilis were widespread in Nicaragua, affecting even the “better classes.” The survey’s “Sanitary Report for May 1931” stated that the soldiers did not always use the “prophylaxis packets” available to them. Too often they thought, wrongly, that relations with servant girls, rather than prostitutes, were safe. Liquor too made them careless.³¹

The Brighter Side

Life for the soldiers was not unrelieved misery. Food was plentiful and at least adequate. The men, wrote Sultan, preferred “the good old Army ration” to the staples of the Nicaraguan

²⁹ Sultan, “An Army Engineer Explores Nicaragua, 594, 597.

³⁰ *Ibid.*, 617, 626; B. B. Talley, “Bull and Ballots,” *Military Engineer* 24 (July–August 1932), 407–9; Florence Sultan, “Snakes, Bandits, Boredom,” *Military Engineer* 23 (Mar.–Apr. 1931), 149.

³¹ Records of the Interoceanic Canal Board, box 47, folder 2341; *ibid.*, box 50, folder 4174.



The survey party's overland travels were mostly by hired ox-cart. The officers and their wives are en route to a radio broadcast of the Army-Yale football game.

diet. Nevertheless, some developed a taste for oranges, grapefruit, “alligator pears” (avocados), melons, and papayas. The mess sergeant purchased these and other fresh fruits and vegetables, as well as chickens and eggs, in local markets. In the field, the men were able to supplement army fare with wild hogs, venison, turkeys, tapirs, sea turtles, manatees, and fish (including salt water

fish caught inland). The *bejuca* vine proved a safe source of drinking water in the jungle.³²

Interaction between the American *canaleros* and the Nicaraguan people (routinely called “natives” regardless of their social status) appears to have been amicable despite language, religious, and other cultural differences. Sultan reported to the American minister to Nicaragua that the survey party enjoyed cordial contacts with Nicaraguan officials. Nevertheless, he wrote, “There has at times been some tension in the relations between the enlisted men and a certain civilian element here in Granada but nothing very serious has developed. The soldiers have in general behaved splendidly.”³³

When not working on the survey, the men were free to explore the cities and towns along the way and to observe festivals, religious processions, and other activities. Another break from their demanding work came with the discovery of anthropologically significant antiquities. The engineers found notable artifacts on the island of Zapatera in Lake Nicaragua. Among them were two stone images or idols that, with the consent of the government of the republic, the survey brought back to the United States with the intention of placing them at the entrance of the barracks of the 29th Engineer Battalion at Fort Humphreys (now Fort Belvoir), Virginia.³⁴

³² “An Army Engineer Explores Nicaragua,” 595, 596, 626; Talley, “From Corinto to San Juan del Norte,” 349–50; Florence Sultan, “Snakes, Bandits, Boredom,” 149.

³³ Sultan to Matthew E. Hanna, U. S. Minister to Nicaragua, June 26, 1931, Records of the InterOceanic Canal Board, box 52, folder 6088. By “certain civilian element” Sultan probably meant local lowlifes.

³⁴ Sultan, “An Army Engineer Explores Nicaragua,” 623–25.

Some of the soldiers adopted animals taken from the wild, such as monkeys and coatis. Intercompany baseball games helped to fill leisure hours, as well as to provide a touch of home.³⁵ Another touch of home, for some officers at least, was the presence of wives and children, who were permitted to accompany the battalion. Among them was Florence Sultan, wife of the survey’s commander, who published a lively account of her impressions of Nicaragua.³⁶

Disaster in Managua

On March 31, 1931, as the battalion was nearing the completion of its labors, a series of tremors hit Managua, beginning in mid-morning. Then came a major shock, followed by another series of tremors. The devastating earthquake, confined to a relatively small area of the city, also started a fire. The quake and fire caused the collapse of several buildings. About one thousand persons perished. Property damage was estimated at \$15 million. The greatest losses of life occurred at the penitentiary, which had stood on the earthquake’s fault line, and the city’s enclosed market. Tremors were felt in Granada, 26 miles from Managua, but there and elsewhere beyond Managua they caused no death or destruction.³⁷

The American engineers stationed at Granada learned of the catastrophe by a cable sent from Washington to San Juan del Norte and a telephone message from there to Granada, all communications from Managua having been put out of commission by the quake. Colonel Sultan quickly organized a relief team consisting of 6 officers and 28 enlisted men. The men loaded a train with medical supplies; demolition, fire fighting, and pioneer equipment; and “other miscellaneous property necessary for relief work.” Men and materiel arrived in Managua at 3:30 p.m. on the day of the quake.³⁸

Major Hawley’s medical personnel worked until the following morning setting up a facility. They performed 10 major operations and about 20 less critical ones. Hawley and his men provided treatment to all Nicaraguans who asked for it, which no doubt contributed to the good relations between the American soldiers and the local population.³⁹

³⁵ Sultan, “An Army Engineer Explores Nicaragua,” 600–601; “Nicaragua. Lt. Col. Sultan Album, 1930,” Military Images, box 22, CEHO.

³⁶ Florence Sultan, “Snakes, Bandits, Boredom,” 148–51.

³⁷ Sultan, “Nicaragua Earthquake” (letter to the editor), *Military Engineer* 23 (May–June), 277; “Nicaragua Earthquake,” *Military Engineer* 23 (July–Aug. 1931), 354.

³⁸ *Ibid.*, 355.

³⁹ Florence Sultan, “Snakes, Bandits, Boredom,” 149.

The principal activity of the engineer troops was fighting the fires that raged in a 15-block area in the city's center. There they saw that the flames had destroyed or severely damaged "the main business section and a large part of the better residence district." The water mains were broken, and a landslide buried the pumping station at the edge of Lake Asososca. Water had to be carried in by truck. High winds made the situation worse. The continuation of tremors made it dangerous to enter buildings still standing.⁴⁰

Sultan became a member of an emergency Central Committee, which asked him to oversee the restoration of rail communications and the city's water system. He delegated the latter task to an engineer officer and three sergeants, who were assisted by local labor. Other operations carried out by the engineer soldiers were "demolishing dangerous walls overhanging streets, supervising the cleaning of arterial streets, [and] opening vaults and safes of banks, legations, and other public or semi-public agencies." The engineers inspected buildings to determine if they were safe to repair and occupy. Sultan also became the chairman of a committee charged with feeding Managua's many refugees. The committee established two centers for distributing food. By April 24, the daily rations issued reached 24,000. The American Red Cross also dispensed humanitarian aid; Marines and Guardia Nacional troops helped to preserve law and order.⁴¹

The engineer troops brought the fire under control on April 3. After 17 days in Managua, they returned to their quarters in Granada. "[F]or months," wrote 2nd Lt. Benjamin B. Talley, "some could not go to bed in San Francisco Monastery without wondering if the mighty walls would crumble over them during the night."⁴²

As the survey was winding up its work, President Herbert Hoover asked Army Chief of Staff Douglas MacArthur to "convey to these troops my appreciation of their devoted duty." The President was "much gratified with the conduct of the survey."⁴³

Completing the Task

By the summer of 1931, the survey's field work ended. Most of the officers and men departed from Corinto on the *Chateau Thierry* on July 16, sailing through the Panama

⁴⁰ Sultan, "Nicaragua Earthquake," 356–57.

⁴¹ *Ibid.*, 358–59; B. B. Talley, "When the Earth Trembles," *Military Engineer* 24 (Nov.–Dec. 1932), 618–19.

⁴² *Ibid.*, 619.

⁴³ Hoover to MacArthur, May 12, 1931; Records of the Interoceanic Canal Board, box 46, folder 1086.

Canal. The troops from the 11th Regiment were dropped off in the Canal Zone. The others arrived in Brooklyn on July 25. Left behind in Nicaragua to prepare the last shipment of property were a Quartermaster officer and 14 men. Also remaining in Nicaragua were 2nd Lt. William E. Potter and Sgt. Leslie B. Hopkins, who were detailed “indefinitely” to continue the gathering of hydrological and meteorological information.⁴⁴

Sultan lauded the survey’s enlisted men for showing “courage, determination, and the stamina to carry on that deserve the highest praise. They have amply justified the faith placed in the Army Engineers to execute a difficult mission.”⁴⁵

Sultan’s next task was to prepare a comprehensive report on the work of the Nicaragua Canal Survey, which he did in Washington from August 1931 to January 1932, assisted by 1st Lt. Leslie R. Groves (who had commanded the battalion’s Company A) and perhaps others.⁴⁶ Sultan’s information made up the greater part of the report of the Inter-oceanic Canal Board, published as a congressional document in 1932; the document also contained the report on the Panama investigations. Sultan addressed a wide variety of topics: the legislative basis of the survey; the history of the expedition and its field work; physical characteristics of the proposed route; the history of American involvement in the project from the early 19th century onward; the purpose of a Nicaragua Canal; alternate routes; construction aspects; construction and other costs; and advantages of a canal through Nicaragua. The appendixes covered “Hydrological and meteorological studies”; “Medical services and sanitation”; “Probable future traffic through the Panama and Nicaragua Canals”; “Geology”; “Power requirements and their solution”; “Unit prices and allowances”; and “Treaties, rights, privileges, franchises.” The report included plates, tables, and a map.

Sultan proposed essentially the same route favored by earlier investigations: Brito-Rio Grande-Continental Divide-Lake Nicaragua-San Juan River-Deseado River-San Juan del Norte. He recommended that the locks be located at Miramar, on the Rio Grande, and the East Divide Lock Site, in the valley of the Deseado. Each was to consist of a flight of three twin locks.⁴⁷

⁴⁴ *ICB Report*, 50–51; Charles H. Bridges, Adjutant General of the Army, to Sultan, April 17, 1931, Records of the Inter-oceanic Canal Board, box 46, folder 1086; Bridges to Sultan, June 25, 1931, *ibid.*; *Engineer Memoirs: Major General William E. Potter* (Washington, DC: U.S. Army Corps of Engineers, Office of the Chief of Engineers, 1983), vii.

⁴⁵ *ICB Report*, 48.

⁴⁶ *Biographical Register of the Officers and Graduates of the U. S. Military Academy at West Point, New York, VIII, 1930–1940* (Chicago: R. R. Donnelley & Sons, 1940) 188, 382.

⁴⁷ *ICB Report*, 84, 89.

Sultan's report addressed the concerns for earthquakes, pointing out that Nicaragua suffered no more from earthquakes than did Panama, where they had not disturbed the canal. In the Managua quake, he argued, poor construction and the fires caused most of the loss of life and destruction of property. "The threat of an earthquake," Sultan confidently concluded, "does not constitute a menace to the permanence of a Nicaragua Canal." The possibility of massive earth slides, such as had plagued the construction of the Panama Canal, was seen as slight.⁴⁸ It seems odd that Sultan's report did not discuss volcanoes.⁴⁹

In his conclusions and recommendations Sultan stated that a lock canal across Nicaragua was feasible and "presented no problems of design, construction, or maintenance that are not capable of ready solution by a nation that has built the Panama Canal." He estimated the cost of the canal's construction at \$722 million and the annual cost of operation and maintenance at \$10.8 million. Sultan believed that a 172.8-mile canal could be built in 10 years, with another 2 to 5 years needed to negotiate the requisite treaties and to enact essential legislation prior to construction.

"A canal through Nicaragua," wrote Sultan, "will aid our national defense, will foster friendly relations with all Latin America, and will promote trade with Central and South America. It will provide a shorter route from port to port for about two-thirds of the traffic now using the Panama Canal." He recognized that world trade and Panama Canal traffic had declined with the onset of the economic slump of the 1930s but predicted that with the return of normal commerce greater interoceanic canal facilities would be desirable.

Sultan concluded by noting that earlier canal investigations of Nicaragua "did not furnish sufficient data on which to base modern plans" and had been conducted when ships were smaller. He was certain that the information gathered in the 1929–31 survey would be "sufficient to serve for some time to come as the basis of the solution of the Nicaragua Canal problem."⁵⁰

⁴⁸ *Ibid.*, 52–53, 213–14, 215, 217, 219.

⁴⁹ McCullough, *Path Between the Seas*, 323. Earlier in the 20th century, during the debates over canal routes, Philippe Bunau-Varilla, the tireless advocate of a Panama canal, had given to each member of the United States Senate a Nicaraguan one-centavo stamp showing an active volcano; he also pointed out Nicaragua's coat of arms featured a volcano. Whether or not this tipped the balance in favor of Panama, the incident is a prominent part of Panama Canal lore.

⁵⁰ *ICB Report*, 110.

In addition to his formal report, Sultan reached a wider audience with a lengthy article published in *National Geographic Magazine*. He, Florence Sultan, and Lieutenants Talley and Keryn ap Rice wrote articles for *Military Engineer* that described aspects of the survey’s operations, the Managua earthquake, and life in Nicaragua. Like Sultan’s *National Geographic* piece, all were in a popular vein.⁵¹

Aftermath

Despite Sultan’s strong case for a Nicaraguan canal, the Chief of Engineers, Maj. Gen. Lytle Brown, reported that “the advantages do not appear to be sufficient at the present time to warrant immediate action for the construction of a canal across Nicaragua.”⁵² Nevertheless, following Sultan’s suggestion, the Corps of Engineers continued to assign an officer and a noncommissioned officer (later a warrant officer) to Nicaragua to gather meteorological and hydrological data within the watershed of Lake Nicaragua until 1952, at which time the Chief of Engineers transferred the responsibility to the Inter-American Geodetic Survey. The work was finally terminated in 1955.⁵³

For his work in Nicaragua, Sultan was awarded an Oak Leaf Cluster for the Distinguished Service Medal he had received during World War I: The U.S. Military Academy’s *Biographical Register* records that

Colonel Sultan conducted an investigation of the interoceanic canal route with efficiency and maintained high morale among his troops under conditions of unusual hardship and difficulty. By his tact and diplomacy in handling intricate problems he maintained cordial relations with the people of Nicaragua. Following the disastrous earthquake in Nicaragua in Mar. 1931, Colonel Sultan, by his prompt and effective relief work, evoked the appreciation and gratitude of the afflicted people. In the performance of these duties, he demonstrated marked ability, sound judgment, and untiring zeal in a position of great responsibility, thereby rendering services of great value to his Government.

From the Republic of Nicaragua he received the Congressional Medal of Distinction and the Presidential Medal of Merit. Groves received the latter award for his services during the earthquake, as did Hawley and the battalion’s second-

⁵¹ See citations of these articles elsewhere in the endnotes.

⁵² *ICB Report*, 3.

⁵³ *Annual Report of the Chief of Engineers, 1952*, Pt. 1, Vol. 2, 2389; *ibid.*, 1956, Vol. 2, 1935.

in-command, Maj. Charles P. Gross. Members of the battalion were entitled to the Second Nicaraguan Campaign Medal.⁵⁴

Some of the battalion's officers became leading figures in the history of American military engineering. Sultan rose to become commander of the India-Burma Theater in World War II; at the time of his death Lieutenant General Sultan was the Army's Inspector General. Charles P. Gross became the Army Service Forces' Chief of Transportation in World War II and retired as a major general. First Lt. Leslie R. Groves was destined for fame as the leader of the Manhattan Project, which developed the atomic weapon that brought about the end of World War II. Second Lt. Kenneth D. Nichols became Groves's principal subordinate in his capacity as head of the Manhattan Engineer District. The battalion's supply officer, 2nd Lt. Benjamin B. Talley, a rare example in that period of a non-West Point Engineer officer, later distinguished himself by overseeing projects in Alaska and playing a noteworthy role in the planning of the Normandy invasion in World War II. The battalion's chief medical officer, Maj. Paul R. Hawley, became the chief surgeon of the European Theater of Operations and, following his retirement, the medical director of the Veterans Administration. Second Lt. William E. Potter, the assistant supply officer and personnel officer, closed out his military career as governor of the Canal Zone. In retirement he served as the senior vice president of the Disney Corporation.⁵⁵

Potter later shared his memories of some of these officers. Sultan was, in Potter's estimation, "Very fine, good administrator" who "knew what he was doing." According to Potter, Major Hawley was a "darned fine officer." He recalled Groves, in whose company he served, as a "hard taskmaster," and remembered Nichols "outstandingly." As for Potter himself, he looked back fondly on the months with the canal survey: "I enjoyed every minute of it."⁵⁶

A later indication of the enduring attraction of Nicaragua as a canal site was a

⁵⁴ *Biographical Register of the Officers and Graduates VIII*, 188, 382. Laws limiting the ability of military personnel to accept medals from foreign governments required congressional action before Sultan, Gross, Groves, and Hawley could receive the Nicaragua awards. House Committee on Military Affairs, *Dan I. Sultan, Leslie R. Groves, Paul R. Hawley*, 72nd Cong., 1st sess., 1932, H. Repts. 1226, 1227, 1228. The Second Nicaraguan Campaign Medal was for service in Nicaragua, 1929–33 (during the Sandino rebellion), by members of the Army, Navy, and Marine Corps. Evans E. Kerrigan, *American War Medals and Decorations* (New York: Viking Press, 1971), 92.

⁵⁵ Information on Sultan, Groves, Nichols, Talley, and Potter are in "Biographical Files," CEHO.

⁵⁶ Potter, *Engineer Memoirs*, 7–8.

1939 message from the Department of State informing the Secretary of War that President Franklin Roosevelt wanted the Corps of Engineers to “make surveys and estimates of costs for a barge canal and highway across the Republic of Nicaragua.” Chosen to lead the operation was Lt. Col. Charles P. Gross, Sultan’s second-in-command in the 1929–31 survey. Gross began his examination in August of 1939 and returned to the United States in November, leaving Lt. William B. Bunker to conclude the work, which he did in 1940. No published report of this survey resulted, and America’s entry into World War II put aside serious consideration of a Nicaragua canal for the foreseeable future.⁵⁷

Conclusion

The 1929–31 canal survey in Nicaragua is reminiscent of the 19th-century explorations of the West carried out by Army Engineers, particularly the Corps of Topographical Engineers. Much of their work involved surveying routes for roads, railroads, and canals. Their reports, like Sultan’s of 1932, are rich with details about terrain, geology, climate, natural history, and native peoples.⁵⁸

Despite the resounding success of the Panama Canal, the 20th-century surveys for a Nicaraguan canal—and a considerable literature concerning such a possibility—offer ample testimony as to the persistence of a dream that began with the Spanish conquistadors. Interest in a Nicaragua water passage waned but never died. Among the people of Nicaragua it remains a fond hope.

By the end of World War II, American interest in a Nicaragua canal had declined considerably. Despite fears to the contrary, no serious threat to the Panama Canal materialized during the war. For a while, the canal continued to accommodate all but the largest vessels. But huge cargo vessels too big for the canal began to dominate transoceanic shipping. Also unable to pass through the canal were the newer, larger naval vessels. These developments led not to renewed demands for a Nicaragua canal but rather to proposals for the enlargement of the Panama Canal, either by widening the existing locks or adding a third set of locks. Then too, any serious advocating of a Nicaragua Canal would surely resurrect objections to it raised during the earlier debates

⁵⁷ *Annual Report of the Chief of Engineers, 1940*, Pt. 1, Vol. 2, 2308. Although no report of this survey was published, records of it can be viewed at the National Archives in College Park, MD.

⁵⁸ See William H. Goetzmann, *Army Exploration in the American West, 1803–1863* (New Haven: Yale University Press, 1959), and Frank N. Schubert, *Vanguard of Expansion: Army Engineers in the Trans-Mississippi West, 1819–1879* (Washington, DC: Historical Division, Office of Administrative Services, Office of the Chief of Engineers, 1980).

over the best route for an isthmian canal, such as its greater length compared to a Panama route, seismic activity, the need for more locks, higher operating costs, and the lack of good harbors on the Nicaraguan coasts.

Nevertheless, the Nicaragua Canal Survey remains historically significant as the latest major reconnaissance for a proposed canal in Central America. It serves also as a reminder that the Isthmus of Panama was never considered as the only feasible location for the linking of the oceans.

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