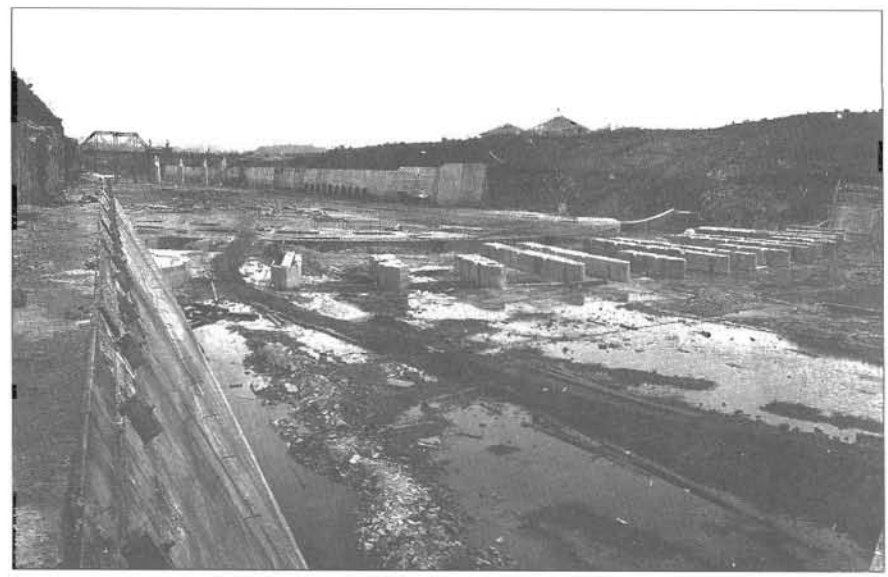
The Corps and the Canal

By Dr. James W. Dunn

The U.S. Army Corps of Engineers did not build the Panama Canal. It was built by the Isthmian Canal Commission (ICC), which was authorized by the Spooner Act and appointed by the President of the United States. However, Army engineers became involved in the U.S. interest in building a canal in 1870 when President Ulysses S. Grant, stimulated by the opening of the Suez Canal in 1867, ordered the U.S. Navy to conduct surveys of possible canal routes in Central America. The Navy reported to an Interoceanic Canal Commission whose membership included Chief of Engineers Brigadier General Andrew A. Humphreys.



The spillway, looking north from the west wall. Foundations for valve and cofferdam piers are in the foreground.

The United States was following the path of earlier Spanish interest in the possibility of a canal trade route somewhere in Central America. Spanish explorer Vasco de Balboa walked across the Isthmus of Panama to the Pacific Ocean in 1513, and in the middle of the 16th century a Spanish Catholic priest, Father Francisco de Gomara, wrote a book about a canal in either Nicaragua or Panama. However, it was not until the 18th century that the Spanish conducted surveys of potential routes. In 1787 Thomas Jefferson, the U.S. minister to France, made an unsuccessful attempt to obtain those survey reports.

From the middle of the 19th century, the United States made increasing use of the Panama isthmus as settlers moved to the new lands gained in the Mexican War, and gold seekers rushed to the California mining sites. In 1850 a U.S. company obtained the right to build a railroad across Panama and completed a one-track line in 1855. Among those who crossed from the Atlantic to the Pacific in those mid-19th century years was Captain Sam Grant, when he moved his family in 1852 to his assignment with the 4th Infantry Regiment in Oregon.

After studying the Navy survey reports in the early 1870s, President Grant's Interoceanic Canal Commission concluded that the Nicaragua route was better than Panama because of the high cost of a lock canal through the Isthmus of Panama and the threat of yellow fever and malaria there. However, before the United States could get started, Ferdinand de Lesseps, builder of the Suez Canal, formed a French company to build a sea-level canal in Panama. The Universal Interoceanic Canal Company began work in February 1881, and by midsummer the first yellow fever and malaria cases were reported. There were 125 deaths in 1882 and 420 in 1883. By 1889 de Lesseps' company was bankrupt, and work on the canal came to a halt; the cost of a sea-level canal was too high, and the yellow fever and malaria threat was too great.

While the French struggled in Panama, the United States Maritime Canal Company—which included retired General George B. McClellan, who had entered the Corps of Engineers upon his graduation from West Point in 1846—obtained a concession to build a canal in Nicaragua. Several attempts in the 1880s and 1890s resulted in failure due to high costs and the inability to hire a reliable work force. The U.S. and French failures indicated that private industry could not succeed alone; an interoceanic canal in Central America needed government support.

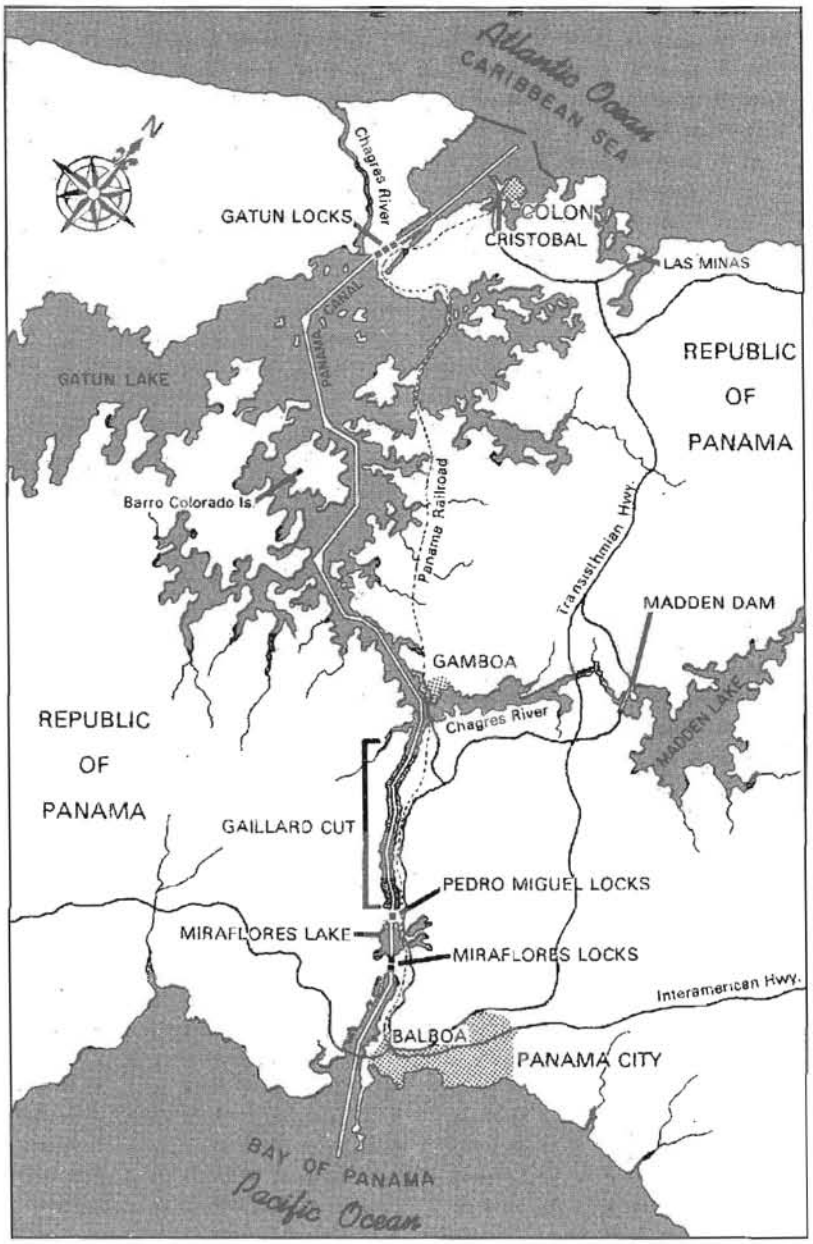
In 1895 President Grover Cleveland appointed a three-member Nicaragua Canal Board to study and compare the two routes—Panama and Nicaragua. The Ludlow Commission, named for Army engineer member Lieutenant Colonel William Ludlow, recommended continued study of the Nicaragua route. To do so, in 1897 President William

McKinley appointed a Nicaragua Canal Commission. It included Professor Lewis M. Haupt of the University of Pennsylvania, who graduated from West Point in 1867 and entered the Corps of Engineers, and Army engineer Colonel Peter C. Hains. That commission also recommended Nicaragua.

The U.S. interest in Nicaragua concerned the French company, which still held the de Lesseps' concession to build a canal in Panama and was interested in selling it to the United States. In 1896 the French hired a New York lawyer, William Nelson Cromwell, as a lobbyist for their renamed New Panama Canal Company. He, in turn, hired retired Army engineer Brigadier General Henry L. Abbot as a technical expert. Abbot wrote a report citing the advantages of a lock canal in Panama over a sea-level canal in Nicaragua.

The Spanish-American War illustrated to the American public the need for some type of canal in Central America when it took the battleship *Oregon* more than 60 days to go from San Francisco to the Caribbean by way of Cape Horn. In December 1898, the French made an official approach to the United States about buying the concession rights of the New Panama Canal Company.

To sort this all out, Congress appropriated $1 million to fund an Isthmian Canal Commission to recommend either Panama or Nicaragua as the route for an interoceanic canal. The ICC included Haupt and Hains from the previous commission and Army engineer Lieutenant Colonel Oswald H. Ernst. When the November 1901 report recommended Nicaragua because it was cheaper than Panama (the New Panama Canal Company valued its assets at $100 million), the French hired Philippe Bunau-Varilla to support Cromwell's lobbying efforts in the United States. Bunau-Varilla was a French engineer who had worked for de Lesseps in Panama and was a shareholder in the New Panama Canal Company. While Bunau-Varilla talked about the advantages of Panama over Nicaragua—such as better harbors, a shorter route, and an operating railroad—he also got the New Panama Canal Company to revalue its assets at $40 million. That made Panama cheaper than Nicaragua, and an amended ICC report in January 1902 recommended the Panama route.



Map of the Panama Canal Zone

With that report Senator John C. Spooner successfully sponsored an amendment to turn a Nicaragua bill into a Panama bill. The Spooner Act, signed into law by President Theodore Roosevelt on 28 June 1902, authorized purchase of the New Panama Canal Company for $40 million, purchase of a zone in Panama for construction of a canal, and set up a seven-member presidential-appointed Isthmian Canal Commission to build the canal. In the March 1903 Hay-Herran Treaty, the United States and Colombia (which owned Panama) agreed on the purchase price for the French company and payment of $10 million by the United States to Colombia for the right to build a canal in Panama. By August that treaty was a

dead issue, as Colombia wanted more than $10 million from the United States and some of the $40 million going to the French company.

Fearful that the United States would go to Nicaragua, Panamanians interested in having the canal built across the isthmus approached Bunau-Varilla. Acting as their representative, Bunau-Varilla talked with officials in Washington and then promised the Panamanians U.S. support in the event of a revolt and break with Colombia. After an almost bloodless revolt on 3 November, Panama declared itself a republic on 4 November. In the early morning of 6 November, Army engineer Major William M. Black, at the request of the Panamanians, raised the flag of the new republic over the city of Colon.

Major Black and Army engineer Lieutenant Mark Brooke were in Panama as representatives of the ICC to study and report on the New Panama Canal Company in anticipation that Colombia would agree to the Hay-Herran Treaty. Both engineer officers remained in Panama into1904, with Black as acting chief engineer and Brooke signing for transfer of the New Panama Canal Company property to the United States on 4 May 1904.

Bunau-Varilla, as Panamanian envoy to the United States, signed the Hay-Bunau-Varilla Treaty on 18 November 1903. The United States purchased from Panama a 10-mile zone across the isthmus for $10 million and $250,000 annually, guaranteed Panama's independence from Colombia, and paid the French $40 million for the New Panama Canal Company. After Panama ratified the treaty in December 1903 and the U.S. Senate did so in February 1904, President Roosevelt—as required by the Spooner Act—named a seven-member ICC to build the canal. The ICC included Colonel Hains and Lieutenant Colonel Ernst.

The first ICC chief engineer was John F. Wallace, who was a railroad engineer and general manager of the Illinois Railroad when he took the job to build the canal. He arrived in Panama to take over from acting chief engineer Major Black in July 1904, but he resigned a year later. He was fearful of the yellow fever threat and attracted by a better-paying job in the United States. Railroad engineer John Stevens—an executive with the Chicago, Rock Island, and Pacific Railroad—replaced Wallace and arrived in Panama in July 1905. He remained longer than Wallace and was successful in building a solid infrastructure that included worker and family quarters. His railroad excavation system functioned like a conveyor belt with the trains carrying the dirt from the steam shovels directly to the dump sites.

Stevens was ready to dig in 1906, but the type of canal—sea-level or lock—remained a question. Wallace had recommended a sea-level canal, but Stevens favored a lock canal. A 13-member board of consulting engineers recommended, by an 8-5 margin, a sea-level canal, but the ICC accepted the minority report for a lock canal written by retired Army engineer Brigadier General Henry L. Abbot. The plan President Roosevelt signed into law in June 1906 called for a canal with three locks on the Atlantic side, three on the Pacific side, and a lake in the middle created by damming the Chagres River at Gatun.

Stevens never got very far with this plan because he resigned in February 1907. His strength was as a railroad construction engineer, and by 1907 the conveyor-belt-type railroad system was in place. What awaited Stevens was hydraulic engineering: the design of dams and locks and the large-scale use of concrete. That was not his strength, but it certainly was the strength of Army engineers in the U.S. Army Corps of Engineers. Thus, it was to the Corps that President Roosevelt looked to get someone who could not quit.

On 18 February, Roosevelt summoned Army engineer Major George W. Goethals to the White House for an interview and, on 26 February, he announced that Goethals was going to Panama as chairman of the ICC and chief engineer to complete construction of the Panama Canal. As a member of the Army General Staff, Major Goethals had accompanied Secretary of War William Howard Taft to the Canal Zone in 1905 to recommend sites for coast defense fortifications.

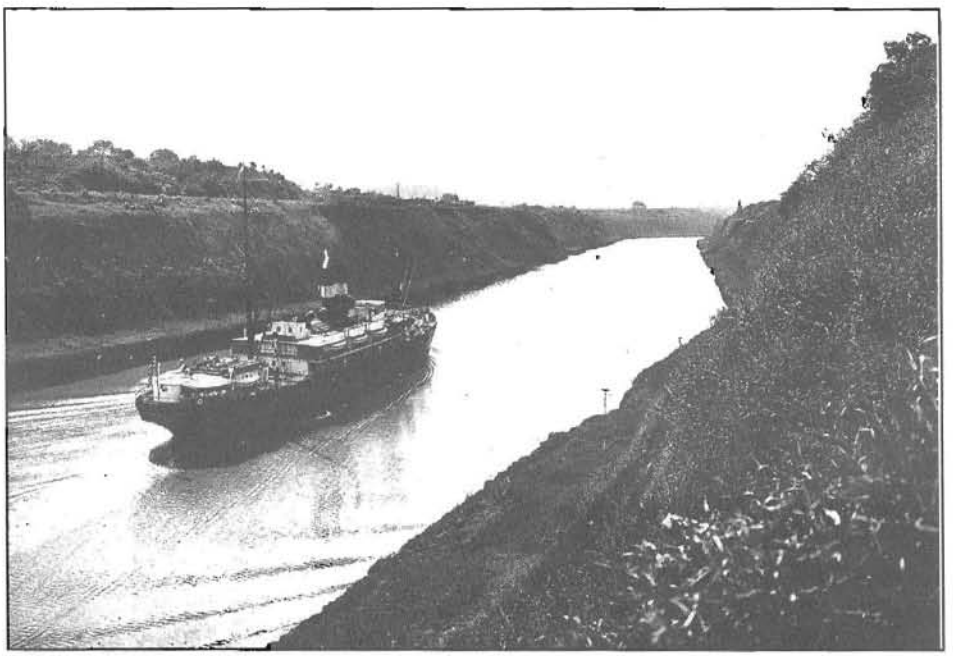
In 1907 Goethals was 47 years old and had almost 30 years experience as an officer in the Corps of Engineers. Upon graduation from West Point in 1880, he entered the Corps and began a career of river-and-harbor and lock-and-dam construction work on the Ohio and Tennessee Rivers, canal work at Muscle Shoals, and coast defense construction work in New England.

Promoted to Lieutenant Colonel in March 1907, Goethals took with him to Panama as members of the ICC two other Army engineers, Majors David Gaillard and William Sibert. Both were members of the West Point class of 1884. Gaillard was serving on the General Staff with Goethals and had experience in river-and-harbor work, while Sibert had a river-and-canal work background.

Goethals placed Army engineer Major Harry F. Hodges in charge of the ICC office in Washington, D.C., where he could use Corps personnel throughout the United States to help select and inspect equipment to be sent to the Canal Zone. Goethals initially organized the canal work by type, putting Gaillard in charge of excavation and dredging and assigning Sibert to lock-and-dam construction.

After several months of observation, Goethals was ready to make some changes. In late 1907, he moved the two Sosa Hill locks on the Pacific side inland to Miraflores because of the threat of naval bombardment. He brought Hodges to Panama as assistant engineer in charge of lock design and replaced him in Washington with Army engineer Major Frank C. Boggs. He widened the bottom width of the Culebra Cut, a channel through the Culebra Mountain in the Continental Divide, from 200 to 300 feet; and, on the recommendation of the Navy, increased the lock widths from 100 to 110 feet.

Goethals reorganized construction responsibility on a geographic basis. Major Sibert got the Atlantic Division from the ocean through the Gatun Locks to the Gatun Dam, and Major Gaillard got the Central Division of Gatun Lake and the Culebra Cut. Sydney Williamson, a Corps civilian engineer who had worked with Goethals in Tennessee and New England, got the Pacific Division from the Pedro Miguel Lock through the Miraflores Locks to the ocean. Goethals divided each division into districts, with a superintendent of construction in charge, and he organized his headquarters into sections responsible for design, buildings and equipment, and survey and personnel. Similar to the Corps system, design and general planning came from the headquarters while the details were left to the divisions.



The SS Panama in Culebra Cut, near Empire, on a trip southward through the canal.

Construction of the Gatun Dam began in 1907. The 1.5-mile earthen dam, with a concrete spillway in the middle, crossed the Chagres River to create a 164-square-mile lake as part of the canal. Lock construction began in 1909, with Army engineer Major James P. Jervey supervising masonry work of the triple locks. In 1912 Army engineer Lieutenant Frederick Mears completed relocation of the Panama railroad required by the creation of Gatun Lake. The canal was near completion in 1913, when steam shovels working from both ends of the Culebra Cut met in May and Gatun Lake began to fill in June. In September a trial lockage at the Gatun Locks resulted in the tug *Gatun* rising from the lowest chamber to the lake in 1 hour and 51 minutes. The canal would have opened in 1913 but for slides in the Culebra Cut.

Fortification of the Canal Zone was only partially completed by 1913. The Hay-Buana-Varilla Treaty gave the United States the right to fortify the zone, but it was not until 1911 that Congress appropriated the funds to begin fortification construction. With Sydney Williamson as construction supervisor and Army engineer Major Eben E. Wilson the design engineer, construction began that year on three forts on the Atlantic side and two on the Pacific. In 1912 the Chief of Engineers organized a section in his office under Goethal's son, Army engineer Lieutenant George R. Goethals, to oversee fortification construction in the Canal Zone. The first Atlantic fort was operational in 1914 and the first on the Pacific side in 1916. By the time the United States entered World War I, there were nine operational forts at each end of the canal.

With the canal ready to open, an April 1914 executive order abolished the ICC and established the Panama Canal with George W. Goethals as the first governor of the Canal Zone. Although the start of the war in Europe overshadowed it, the canal officially opened on 15 August when the liner *Ancon* passed from the Atlantic to the Pacific side. While most of the Army engineers who had worked on the canal were there in 1914, one was missing. Lieutenant Colonel David DuBose Gaillard left Panama in 1913 to seek medical attention in the United States. He died in Baltimore on 5 December 1913 of a brain tumor, and in April 1915 President Woodrow Wilson renamed Culebra Cut as Gaillard Cut in his honor.

There were rewards and honors for all for completing the canal, highlighted by the March 1915 promotions of George W. Goethals and Harry F. Hodges to major general and William Sibert to brigadier general. However, for the Army engineers, the greatest reward over the years proved to be not only that they had completed construction of the canal but that they had built a canal for the centuries. At the end of the 20th century, the Panama Canal was still operating as a vital link in world commerce.

Dr. Dunn is a historian in the Office of History, U.S. Army Corps of Engineers, Alexandria, Virginia.

Suggested Reading

Gerstle Mack, *The Land Divided;* David McCullough, *The Path Between the Seas.*