THE NAVY CIVIL ENGINEER CORPS

HISTORICAL VIGNETTES

INTRODUCTION

History is the sum total of individual accomplishment. If we are, therefore, to know the history of the U.S. Navy's Civil Engineer Corps, we must know and understand the men that made that history.

Consequently, this collection of historical vignettes focuses primarily on individuals and their deeds, although organizational developments and individual projects are not neglected -- for without knowledge of the latter there would be no historical context to make comprehensible the former.

The newly-established Navy needed a shore establishment to build and maintain its vessels and support its personnel in times of peace and war; this single fact led eventually to the hiring of civil engineers, the establishment of a staff corps of civil engineers, and finally the creation of a Naval Construction Force officered by members of this staff corps.

The following pages will trace the history of the Civil Engineer Corps, through the interaction of men and events, from almost the very origins of the U.S. Navy down to the present. The reader will meet the first civil engineers who built for the Navy, see the establishment of the Bureau of Navy Yards and Docks which would eventually evolve into today's Naval Facilities Engineering Command, witness the transformation of the Navy's first civil engineers into commissioned naval officers and follow these officers through two major and three minor wars -- one of which saw the creation of the famed Seabees.

The present is an ever advancing line; the events of a second ago are already history. In order to understand where we are, and where we are going, we must know where we have been. That is the purpose of this collection -- to tell today's Civil Engineer Corps officers who their predecessors were and what they did.

THE FOUNDING FATHERS:
THE FIRST CIVIL ENGINEERS WHO BUILT FOR THE NAVY

Before the establishment of the Navy Civil Engineer Corps, before even the establishment of the Bureau of Navy Yards and Docks, two prominent civilian civil engineers built shore facilities for the Navy.

BENJAMIN HENRY LATROBE (1764-1820)

The first to do so was Benjamin Henry Latrobe, a noted architect and civil engineer of the first years of the nineteenth century. Born the son of a Moravian minister of French descent in Yorkshire, England, Latrobe was educated in both England and Germany. In 1793 he began working as an engineer and architect in London. In 1796, three years after the death of his wife, Latrobe immigrated to the United States with his two children, and continued working as a civil engineer.

It was said that Latrobe "..found architecture in America a polite accomplishment of gentlemen amateurs and left it a profession, with professional standards and practices, largely in the hands of his own pupils." Apprenticeship with Latrobe constituted the first important professional training in engineering and architecture in America, and his style dominated building in the U.S. until the Civil War.

In 1798 Latrobe designed and built the new Bank of Pennsylvania in Philadelphia and a city water supply system for the same city, the first in America.

In 1802 President Thomas Jefferson called Latrobe to Washington to make drawings, surveys, and estimates for a dry dock to keep the Navy's twelve frigates seaworthy. Congress, however, refused to appropriate the necessary $417,276 so the dock was not built. In 1803 President Jefferson created the post of Surveyor of the Public Buildings for Latrobe with an annual salary of $1,700. Latrobe's first assignment was the construction of the south wing of the Capitol, which contained the Hall of Representatives.

In 1804 Latrobe received the title "Engineer of the Navy Department" (the entire department consisted of the Secretary of the Navy and three clerks!) and prepared plans for the development of the Washington Navy Yard. The yard he built was burned to keep it out of the hands of the invading British in 1814; however, his 8th Street (Main) gate still exists and the basic layout of the yard remains his.

In 1807 Latrobe produced designs for the remodeling of the White House; and the following year made the plans for a Marine Hospital. In 1809 he also drew up plans for the development of navy yards at New York and Norfolk, Virginia.
Following a private venture which failed, Latrobe returned to Washington in 1815 to take charge of rebuilding the Capitol building, burnt by the occupying British during the War of 1812. He resigned this position in 1817 over differences with the Capitol commissioner. This was his last work for the federal government.

While Benjamin Latrobe has the distinction of being the first civil engineer to carry out shore facility construction projects for the Navy, he was not really a Navy civilian employee. Instead, he was commissioned to execute specific projects for the Navy in the manner of one of today's architect-engineer contractors.

LOAMMI BALDWIN (1780-1838)

Although Latrobe produced development plans for navy yards at New York and Norfolk, none was built until years after his death. Finally, in 1826 Congress passed and President John Quincy Adams signed a resolution calling for the construction of two dry docks, one at Boston and the other at Norfolk. Loammi Baldwin, a noted Boston engineer, was selected to design and construct the dry docks.

Baldwin was born in North Woburn, Massachusetts, and was descended from Deacon Henry Baldwin, an original settler of the town. He was the third son of Loammi Baldwin (1744-1807} who had commanded the main guard of Washington's Army during the retreat from Delaware and the attack on Trenton.

Following his preparatory education at Westford Academy, the younger Baldwin attended Harvard and graduated from there in 1800. Baldwin demonstrated mechanical aptitude early on and in 1802 designed and built the first fire engine of Groton, Connecticut; this engine remained in use for more than 80 years. In 1804 Baldwin was admitted to the bar and practiced law for the next three years. In 1807 he gave up law and went into public works construction, a career he followed for the rest of his life.

The Navy Department (now comprising approximately two dozen employees} employed Baldwin from 1827 till 1834 to build the two above-mentioned dry docks.

During this period he was referred to as the "Superintendent of dry-docks and inspector of navy yards." In an era when tools and equipment were relatively primitive (pile drivers were operated by men walking on treadmills), the construction of the new dry docks constituted large-scale projects of some difficulty. While construction went forward at Boston and Norfolk, Baldwin surveyed New York harbor for a third dry dock which was not built until after his death.

Following his work for the Navy, Baldwin prepared reports on the freshwater supply of Boston and the Brunswick canal and railroad system. He became a Presidential elector for Massachusetts in 1836 and died in 1838.

Although they built the Navy's first major shore facilities, neither Latrobe nor Baldwin were career Navy civilian employees; the concept hardly existed at that time. Both men were hired to carry out specific engineering projects for the Navy and when the projects were completed, both left the Navy's employ. During the first three decades of the Nineteenth Century the Navy Department did not have any full-time civil engineering support. Nevertheless, the man who would be the Navy's first full-time civilian civil engineer as well as, many years later, the first Civil Engineer Corps officer was already on the Navy payroll in 1829.

CIVIL ENGINEER (CAPT) WILLIAM P. S. SANGER, USN
THE NAVY'S FIRST CIVIL ENGINEER

William P. S. Sanger was born in 1810 in Massachusetts and in 1826 was apprenticed to Loammi Baldwin of Boston to learn the trade of civil engineering. The lack of formal engineering training was common at the time because until 1825 the U.S. Military Academy was the only engineering school in the country (run by the Army Corps of Engineers at the time).

However, in January 1825, Stephen Van Rensselaer opened the doors of his new polytechnic institute at Troy, New York. Rensselaer Polytechnic Institute, the oldest institution of higher learning in an English-speaking country to devote itself to science and engineering, developed a close association with the Civil Engineer Corps during the following 100 years, an association which remains strong down to the present.

During the period 1827-34, Sanger represented Baldwin during his absences, at the construction site of Dry Dock No. 1 in Norfolk, Virginia. Although only temporarily on the Navy's payroll at this time, Sanger was destined to play a central role in the development of Navy civil engineering and the establishment of the Navy Civil Engineer Corps.

In 1836, no doubt as result of his previous work for the Navy, Sanger was appointed "civil engineer for the Navy" on the staff of the Board of Navy Commissioners, a board of three senior captains instituted in 1816 as advisors to the Secretary of the Navy on technical aspects of Navy management.

By a Congressional Act of 31 August 1842 the Navy Department was completely reorganized, the Board of Navy Commissioners was abolished and a system of five bureaus, each responsible for a specific aspect of Navy activity, was created in its place. This organization would remain largely unchanged for the next 124 years.

The first of the five bureaus was the Bureau of Navy Yards and Docks (the Reorganization Act of 1862 dropped "Navy" from the title) and its first chief was CAPT Lewis Warrington, USN, formerly head of the Board of Navy Commissioners. On 15 September 1842 the Secretary of the Navy appointed William P.S. Sanger “civil engineer” of the new bureau with an annual salary of $2,000. In addition to CAPT Warrington and Sanger, the bureau's staff consisted of a chief clerk, two other clerks, a draftsman, and a messenger.

One of the first tasks confronting the bureau was the construction of a new navy yard at Memphis, Tennessee, "•..for the building and repairing of 'steam ships and other vessels of war at that place." Following an initial investigation by an officer board, Sanger went to Memphis in 1845 to select a site for the proposed facility. Unstable soil conditions and erosion problems, however, led to the project being dropped in 1854.

In the meantime Sanger went to California to examine the site of a new yard that the Navy was planning to build at Mare Island to support the squadron that would henceforth be stationed on the west coast. While the yard was under construction, a floating dry dock was built in the east and moved to San Francisco in 1852 to provide fleet support. The Mare Island Navy Yard was officially established in 1854.

In 1851 the bureau completed construction of a third dry dock at the Brooklyn Navy Yard. Dry dock facilities were soon available at all seven navy yards. Three of these dry docks were floating dry docks for the Portsmouth, Philadelphia, and Pensacola yards; the Washington Navy Yard

was, however, serviced by a marine railway in lieu of a dry dock. In 1857 Congress also appropriated funds for a coal depot at Key West, Florida.

During the Civil War Confederate troops captured and later destroyed the navy yards at Norfolk and Pensacola. These yards were subsequently rebuilt and naval stations were established at Mound Hill, Illinois; Memphis, Tennessee; Port Royal and Beaufort, South Carolina; and Baltimore, Maryland. Following the war, land was taken at New London, Connecticut, which subsequently became a coaling station; and in 1869 a torpedo station was established at Newport, Rhode Island. A major project of the period was the building of a new navy yard on League Island in Philadelphia, the first navy yard built to provide support for the new iron warships that were then being constructed.

As the years passed and the value of a staff civil engineer became increasingly obvious, the commandants of the various navy yards hired other civil engineers, one for each yard, to oversee construction and repair. However, as the single civil engineer working directly for the bureau in Washington, Sanger was preeminent; and he increasingly coordinated the activities of the other civil engineers. Sanger was able to secure appointments at various navy yards for civil engineers such as Benjamin Chandler, Charles Hastings, and Calvin Brown, men who would later be among the first Civil Engineer Corps officers.

When Sanger received his appointment the entire shore establishment consisted of seven navy yards, four hospitals, four magazines, five stations for recruiting and other purposes, and the Naval Asylum (now the Naval Home). During the fifty-one years that he, in one form or another, worked for the Navy Department, Sanger saw the Navy change from a small collection of wooden sailing vessels, some of which dated back to the revolution, into a modern steam propelled, ironclad fleet.

During Sanger's career the first floating dry docks were built and the first iron ship, the USS MICHIGAN, was launched, the Naval Academy was founded, and navy yards and stations were linked with telegraph wire and poles as communication systems advanced. Sanger himself was largely responsible for the creation of a shore establishment that could effectively support this fleet. During his career, the Navy fought the Mexican and Civil wars and expanded its shore establishment from a few bases on the eastern seaboard to huge navy yards on both coasts, and a chain of coaling stations extending across the Pacific to Asia.

In addition to his role in building the Navy's shore establishment during a critical period in the nation's history, Sanger also played a preeminent role in transforming the Navy's civilian civil engineers into a staff corps of commissioned officers -- the Civil Engineer Corps.

THE BIRTH OF THE CIVIL ENGINEER CORPS

For more than a century, Civil Engineer Corps officers have celebrated 2 March 1867 as the birth-date of their corps. However, the truth of the Civil Engineer Corps' origin is somewhat more complicated than a simple establishment on a single date.

Whatever the significance of 2 March 1867, there is no doubt that prior to that date Navy civil engineers were not commissioned officers and did not comprise a staff corps. They were simply civil servants employed at the Bureau of Yards and Docks and at the various navy yards under its cognizance. Instead of "civil servant," the contemporary term “civil officer” was most often used to describe such civilian employees during this epoch. Nevertheless, this term is ambiguous to some degree. In the 1860s and 1870s, it was synonymous with the term “civil servant;” however, during much of the 19th century, the Navy also used the term “civil officer” to mean a commissioned officer of a staff corps. This usage was perfectly consistent, since line officers during this period considered staff officers to be nothing more than noncombatant civilian specialists in uniform, despite the fact that staff officers held Presidential commissions just as line officers did. The first Navy civil engineers were few in number; there were only seven on 7 March 1867. Premier among them was William P. S. Sanger, whom, as we learned earlier, the Board of Navy Commissioners originally hired as a staff civil engineer in 1836.

Until 1850 the Navy paid its civil engineers out of funds provided for the works they were supervising. However, in 1850 they were placed on the civil list along with naval constructors. They were henceforth "civil officers" and the Navy paid them out of funds appropriated for the pay of the personnel of its civil establishment.

The first indication that the Navy was considering making its civil engineers into commissioned officers appeared in the Secretary of the Navy's report of 5 December 1855. In it, Secretary of the Navy James C. Dobbin said, "After much reflection and attentive observation of the practical workings of the present system, I am very favorably inclined to the plan suggested by a predecessor, of establishing a distinct corps in the Navy, whose duty shall be confined to hydrography, ordnance, civil engineering, and other scientific duties."

Despite Secretary Dobbin's being “favorably inclined,” there was no change in the status of civil engineers until 1867.

On 2 March 1867 -- the date that would one day be celebrated as the birth-date of the Civil Engineer Corps -- the Thirty-Ninth Congress devoted exactly thirty-one words to civil engineers (and naval storekeepers) in an appropriations act: “Provided that civil engineers and Naval storekeepers, when required at any of the Navy yards, shall be appointed by the President by and with the advice and consent of the Senate,....” These few words do not make it clear that the Civil Engineer Corps carne into being on the date of the 1867 act. The act says nothing about civil engineers being commissioned nor does it mention the establishment of a new staff corps. The latter would, of course, follow from the former. The key phrase of the act is “•..shall be appointed by the President....” Prior to 2 March 1867, civil engineers, like other civilian employees, were appointed by the Secretary of the Navy henceforth, the President would appoint them. As well as making civil appointments, the President also appointed men to commissioned officer status.

Did Congress intend to give civil engineers commissioned status by making their position a presidential appointment? Unfortunately, Congress' intent is not clear -- the act is simply too brief and vague for this conclusion to be drawn. Can the status of naval storekeepers, who are

included in the act, provide a clue to Congress' intent? Unfortunately, no. Depending upon the situation, both civilian employees and commissioned officers could hold the appointment of naval storekeeper.

Nevertheless, one pivotal fact can be extracted from the act of 2 March 1867. It was now at least possible to consider civil engineers commissioned officers. Prior to 1867 they could not have been commissioned officers under any circumstances because they did riot hold presidential appointments. However, the act of 2 March 1867 was so ambiguous about the status of Navy civil engineers that an additional fourteen years were to pass before they would completely win recognition as commissioned officers constituting a new staff corps.

For almost two years after the passage of the act of 2 March 1867, there was nothing to indicate that the status of civil engineers had changed. The Navy Register of 1 January 1868, a publication which lists all commissioned and warrant officers, did not list civil engineers. The Navy also continued to pay civil engineers from funds appropriated for its civil establishment.

The following year, however, brought a change. The Navy Register of 1 January 1869, listed five civil engineers in a section entitled “Naval Constructors and Civil Engineers” (naval constructors had been commissioned officers since 13 March 1863 and constituted a staff corps). Nevertheless, the register does not show civil engineers in its pay table, indicating that the Navy still did not pay them out of funds appropriated for military personnel. It is in the Register of 1869 that the term “commission” is first used in conjunction with civil engineers. A “date of commission” of 28 March 1867, is given for the five civil engineers listed in the register. Inexplicably, the register does not list William Sanger among the civil engineers, although he was most certainly a Navy civil engineer in 1869. Sanger first appears in the Register of 1 January 1873, and 3 March 1867, is given as his date of commission.

The "commission" referred to in the register must be a military commission and not simply a civilian appointment because only military officers are supposed to appear in the registers and the same terminology is used in the section dealing with line officers. Congress changed the pay status of civil engineers the following year. The third section of the act of 15 July 1870 (Section 1556, Revised Statutes), which fixed the pay of Navy officers on the active list, included civil engineers in its provisions. Henceforth, the Navy paid civil engineers out of the military personnel appropriation. Both the Navy and Treasury Departments clearly recognized civil engineers to be commissioned officers. Their pay was fixed on the longevity system like that of other officers and deductions were made for the benefit of the Navy Hospital Fund. Under the Law of 1799 only "the officers, seamen, and marines of the Navy of the United States" were liable for this levy.

The Register of 1 January 1871 reflected this change in status; there was now a listing for civil engineers in the officers' pay table. Thus, civil engineers were appointed by the President, listed in the Navy Register, and paid as commissioned officers. The only thing that civil engineers lacked was rank.

Until 3 March 1899 staff corps officers did not possess military rank. Rank was a jealously guarded prerogative of line officers. Instead of military rank, the Navy granted staff corps officers "relative rank." Staff corps officers had professional titles (i.e., chief engineer, assistant surgeon, paymaster, etc.) and "ranked with" corresponding line officer grades (i.e., "pay director ranking with captain"), but did not have actual rank. Until 1871 no attempt was made to assign even relative rank to civil engineers. This was changed on 3 March 1871 when Congress passed an act which stated that "civil engineers shall have such relative rank as the President may fix."

Despite this new authority, another ten years would pass before a president would "fix" relative rank for Navy civil engineers.

Congress in an act of 27 February 1877 further clarified the status of civil engineers. In Sections 1473 through 1479 of the Revised Statutes, Congress discusses the relative rank assigned to officers of the Medical Corps, Pay Corps, Engineer Corps, Naval Constructors, Civil Engineers, and Chaplains. (Section 1478 dealing with civil engineers merely repeats the words of the act of 1 January 1871.) Next follows an emendation to Section 1480 which states: “The grades established in the six preceding sections for the staff corps of the Navy shall be filled by appointment from the highest members in each staff corps.” Since one of these "six preceding sections" is devoted to civil engineers, Congress clearly indicated that it considered civil engineers to be commissioned officers comprising a staff corps.

In 1878, however, the position of Navy civil engineers was completely reversed as a result of a dispute over the dismissal of one of their number. Attorney General Charles Devens in an opinion of 18 November 1878 ruled, “The appointment [of civil engineers] is local in its character. And although under the act of 3 March 1871, the President was given discretionary power to confer relative rank upon civil engineers, this power has never been exercised, and they have no rank by which their relation to the officers or men in the Navy can be determined: Held, accordingly; (1) that civil engineers (in the absence of any action by the President conferring upon them relative rank) are not to be considered Naval officers, but civil officers....”

This ruling, drastic as it might seem, did not appear to affect the status of civil engineers in the Navy. Civil engineers appear in the Navy Registers of 1 July 1878, 1 January 1879, and 1 January 1880 without any indication that their status as officers was altered.

In 1881 the whole question of the status of civil engineers was finally resolved. The first significant event took place on 24 February 1881 when the President “conferred relative rank on civil engineers of the Navy, and fixed the same as follows: one with the relative rank of captain; two with the relative rank of commander; three with the relative rank of lieutenant commander; and four with the relative rank of lieutenant.”

Shortly thereafter, Navy civil engineers, armed with their new relative rank, sought a final resolution of their legal status from the Justice Department. They no doubt wanted a reversal of the 1878 Justice Department opinion that they were not naval officers. The civil engineers petitioned Attorney General Wayne I. MacVeagh to respond to the following question: “Are civil engineers of the Navy officers in the Navy or civil officers connected with the Navy?”

On 12 April 1881 Attorney General MacVeagh, taking into account the relevant acts and amended statutes, reversed the decision of his predecessor and further stated, “...I am led to the conclusion that the civil engineers in the Naval service must be regarded as a staff corps of the Navy -- that they are officers in the Navy' possessing...defined relative rank as such with other officers in the Navy, and are not merely 'civil officers' connected with the Navy.”

The petitioning civil engineers further asked whether they were entitled to full retirement rights as naval officers. Once again, the Attorney General answered in the affirmative. Taking advantage of this second decision, William P. S. Sanger retired from the Navy on 15 October 1881 with the relative rank of captain. He had completed fifty-one years of service to the Navy, first as a civilian employee with Loammi Baldwin and later with the Navy Department and, finally, as a commissioned naval officer. Three other long-serving Navy civil engineers, Benjamin Chandler, Norman Stratton, and Calvin Brown, also chose to retire in October 1881

Whatever the initial status of civil engineers, the Navy did not grant them a uniform until 1881. Six months after the President fixed the relative rank of civil engineers, a uniform circular of 24 August 1881, specified that civil engineers were to wear a regulation staff officer's uniform with the rank stripes placed on a background of light-blue velvet cloth. In addition, the letters "C.E." were to be embroidered in silver old-English script on the shoulder straps and epaulets.

Thus, after fourteen years, Navy civil engineers finally managed to win full recognition as commissioned officers, comprising their own staff corps, and possessing a distinctive uniform.

Why did the first Civil Engineer Corps officers have to suffer so many vicissitudes in order to win recognition for their new status? Part of the problem undoubtedly resulted from the line officer view of staff officers during the 19th century. As Charles O. Paullin in his History of Naval Administration says, "The line naturally resisted the assignment of rank to the staff. An institution that has developed traditions and a corporate life, and that enjoys a monopoly of rights and privileges, is wont to resist strenuously its being cheapened or made common either by undue additions to its membership or by extension of its privileges to others."

Nevertheless, the Navy and the line seem to have accepted civil engineers as commissioned officers fairly early on -- witness their appearance in the Navy Register of 1869.What probably contributed most to the difficulties experienced by Navy civil engineers in winning recognition as commissioned officers was simply their small number and their widely scattered geographical distribution. Of the seven civil engineers in 1867, only Sanger was at the Bureau of Yard and Docks in Washington, DC; the rest were located, one each at various navy yards. Such a small, widely dispersed group did not command much influence in the Navy Department or Congress. Given these very real disadvantages, it is a tribute to the ability and professionalism of these first Navy civil engineers that it did not take them much longer to win recognition for themselves as regular commissioned officers of the Navy.

The struggle to achieve equality with officers of the line and other staff corps was by no means over in 1881. For though recognized as commissioned officers, Civil Engineer Corps officers still could not aspire to the office of Chief of the Bureau of Yards and Docks. Another seventeen years would pass before a Civil Engineer Corps officer became chief, in spite of the fact that the senior officers of the other staff corps were already chiefs of their respective bureaus.

CIVIL ENGINEER (LCDR) CALVIN BROWN, USN
A MOST UNUSUAL NAVY CIVIL ENGINEER

The personal records of early Navy civil engineers are generally sparse and located in scattered record collections and, with one notable exception, the pioneer members of the Civil Engineer Corps left no detailed biographies.

The exception is Calvin Brown who wrote his own biography. Brown was unique among the 19th century members of the Civil Engineer Corps because he served three times as a Navy civil engineer: 1852 to 1864, 1869 to 1881, and in 1898. Since he was not in the Navy's employ in 1867, he did not receive a retroactive commission as a Navy officer dated to 1867 and is not counted as one of the six original Civil Engineer Corps officers.

Brown not only witnessed the Navy's evolution from a small, wooden sailing fleet to a modern steel-hulled navy, but also saw the transformation of the United States from a rural nation into an industrial giant. Brown began his autobiography when he was74 years old and felt he had completed it four years later. However, in 1898 the Civil Engineer Corps increased its strength by two officers to meet the Spanish-American War emergency: one of these was Civil Engineer (LCDR) Calvin Brown, recalled to active-duty at the age of 82.

Brown's autobiography is a word-portrait of the 19th century, which was visually reflected by the famed lithographs of Currier and Ives (Brown in his youth had even been a schoolmate of Nathaniel Currier).Here then is his story:

Calvin Brown was born in Boston's Roxbury District, which he called the “Boston Highlands,” on 25 March 1816. His father, “a more kinder, more loving parent never lived,” died in 1825. His mother subsequently remarried not the cruel antagonistic stepfather most often portrayed in Victorian literature, but rather one who furnished a pleasant home for Brown with “an acquisition of four step-sisters.”

Brown's earliest recollections concern the school system of the time, dominated by stern disciplinarians of Puritan background. He wrote: “The flogging of both girls and boys for all sorts of delinquencies, even the most trifling and accidental, and non-attributable to voluntary design, was the prevailing mode of correction. Faults of mental weakness, weak memories, constitutional inattention to studies, obtuse apprehension and various natural impediments to the acquisition of elementary knowledge were deemed corrigible only by the rod and other appliances of torture, and by many teachers mercilessly administered.”

When he was eight, Brown was taken to Boston to view from a distance the Marquis de Lafayette during his 1824 visit to the former colonies. This was the memorable event in Brown's early life and triggered a new awareness of a world outside his familiar surroundings.

Brown's formal schooling ended at twelve and, after a series of temporary jobs, he was apprenticed to the owner of a Boston bookstore. This gave him an opportunity to acquire and read a great many books hitherto unavailable to him. He later took a similar job with a Roxbury stationer where he learned and practiced bookbinding and related stationer skills. He was subsequently fired from this position when he left early one evening to attend "Master Stimson's dancing class." He returned to work in his stepfather's tannery following this incident and it was during this time that the pivotal incident which determined his later career took place.

By chance one day Brown saw a surveyor "...with a strange machine upon his shoulder [a theodolite]...and...was peculiarly struck with the phenomenon and an intense curiosity." An older friend explained the duties of a surveyor and of the new demands that the railroad industry was making upon this profession. His interest whetted, Brown answered a Boston newspaper advertisement which invited applicants for a newly established engineering office.

Brown entered the employ of Robert H. Eddy, a student and associate of Loammi Baldwin, at about the same time that William P. S. Sanger was in Baldwin's service at the Norfolk Navy Shipyard. Brown found himself on the ground floor of a new profession which gradually made him one of the Navy's most experienced engineers. Of his new job, Brown wrote enthusiastically, "I found myself in the prospect of a career that charmingly disclosed its attractions in the study of the records and graphic illustrations of the wonderful works which had been built by the eminent men in whose trade I had ventured to follow."

The Eddy engineering office had numerous and intriguing projects underway and the principal of the firm dedicated his time and efforts to train his young understudies, of which there were four. The first field assignments the fledgling engineers received were a bridge project between Charles and East Boston, two railroad surveys, and a study of ponds in the Boston area with a view to creating a municipal water supply. Brown became enraptured with his new profession and credits Eddy with providing, "...the most favorable conditions of studentship, with an accomplished elementary instructor, with every appliance needed for practice and study in comfort of a well-furnished office and congenial associates."

Eddy chose Brown to complete a topographical and hydrographical survey of New Hampshire's Merrimack River from Nashua to Amoskeag. The results demonstrated the feasibility of establishing the famed Manchester Mills and Amoskeag Manufacturing Company (for years the largest cotton milling plant in the world). Before he was twenty-one, Brown was offered the job of engineer for the construction of the locks and canals that would furnish hydro-power for the manufacturing complex. He prudently declined the offer because he felt that he was not sufficiently experienced for such responsibilities and that his position with the Eddy firm was most satisfactory. Calvin Brown was wrong, however, about the latter; shortly thereafter he left Eddy because of a "...difference of views and a doubt of [Eddy's] fairness to employees."

Brown's credentials were impressive enough to win him a position with the engineering firm of Thomas Hayward, a former professor of mathematics at Harvard. In a short time, Brown was working with such noted engineers and architects as Loammi Baldwin and Leverett Saltonstall. About the former, Brown wrote, "...I became personally acquainted with Colonel Baldwin, whose engineering attainments and wonderfully attractive manners and sympathy with young people claimed my admiration and esteem."

In addition to developing himself as an engineer, Brown explored works of philosophy during this period of his life. He was an active member of numerous study groups, mostly oriented toward the teaching of the Universalist Church, and he regularly attended the Rev. Hosea Ballou's Young Men's Universalist Institute. Brown was troubled that Christian doctrine was not practiced as preached, that individuals placed the acquisition of wealth ahead of personal ethics, and that this acquisition of wealth was at the expense of other members of society. In fact, Brown was something of a utopian socialist in his personal philosophy.

In 1838, at the age of twenty-two, Brown married; however, he mentions neither his wife's given name nor her family name in his chronicle. The following year, he lost his first child, a son, a week after birth. He was later to lose two other children in the same fashion.

In February 1838 Brown traveled by ship to Georgia to carry out a railroad survey; this was only six years after the building of the first railroad in the United States. As luck would have it, Brown's ship ran into one of the worst Atlantic gales of the period and he suffered grievously from sea sickness: “In my misery I cared not what became of me, any fate the sea god might select would be agreeable if it would afford any mitigation of the sickening-racking torture.” Docking in Charleston, South Carolina, after the nine-day voyage, Brown travelled to Bainbridge, the terminal point of the new railroad. He then went by horseback to Thomasville where he joined the survey party. At Thomasville, Brown met the division engineer, B. F. Thomas, a former Baldwin associate, and Benjamin Chandler, whom he had known from his Boston days. Chandler and Brown crossed paths on a number of subsequent occasions; and the former would later be one of the first six men commissioned as Civil Engineer Corps officers.

The proposed rail line was to run from Thomasville to Brunswick, Georgia; and engineering parties were distributed along 40-mile long sectional divisions. The terrain was greatly different from that in which Brown and Chandler had previously worked; only rarely did a river, swamp, or other obstacle challenge their professional skills. Then, the survey was abruptly terminated; the Atlantic Coast Line Rail Road proved to be undercapitalized and could not continue its proposed expansion. Brown was given a small cash payment for his services, travel expenses, and a promissory note which was never honored. When Brown stepped ashore at New York Harbor on his way home, his first thought was of employment: “...having found myself wanting in the pecuniary means.” He tells his readers that “...unlike other occupations which admit of stationary establishments, it is an inconvenience of the civil engineer's profession that it ordinarily has to be practiced in various and distant localities...for more or less brief periods...after which he must look for another job not always at once available.” Brown, however, was fortunate; he was soon associated with Gridley J. F. Bryant, a longtime architect friend in Boston. Bryant's father was an American pioneer in the use of pneumatic tube and caisson systems for submarine construction. Thus, Brown was able to add submarine construction to his professional knowledge.

Brown enjoyed a successful private practice in the Boston area until 1840 when a new challenge came his way. That year a new wharf at the Portsmouth Navy Yard in New Hampshire collapsed. Alexander Parris, an engineer working at the Boston Navy Yard, was sent to investigate the damage. He chose Brown as his assistant and this job introduced Brown to the fledgling Navy shore establishment. Parris and Brown were appalled by what they found: “It cannot be supposed that the designer, or designers, of this wharf was governed by any knowledge of statical or dynamical laws, but by a simple guess that the thing would do.”

The Navy authorized Parris to design and build a new wharf near the site of the old. Brown became the "draughtsman" for the project. It was found that"...the nature of the site, great depth of water, rapid tidal current and the outward slanting of the rocky bottom, precluded the adoption of a coffer dam, except at a vast expense and suggested the diving bell system as the only economical one." Brown, himself, rode the cast-iron diving bell to the estuary's floor and he did so in an age that did not fully realize the dangers of working under pressure. He and his fellow workers in the diving bell even undertook submarine blasting, a dangerous technique at the time. Following Parris's departure the next year, Brown became chief engineer on the project and saw it through to completion in 1845.

Following this job, Brown went back to railroad surveying; this time working for the Vermont Central Railway, between Montpelier and Boston. After four years, he took yet another railroad survey job in New York State. While practicing his civil engineering career, Brown was becoming

increasingly obsessed with social reform: he actively worked for the abolition of slavery and was very interested in such utopian socialist experimental communities as Brook Farm, near his hometown of Roxbury, Massachusetts. His civil engineering career kept him at a distance from the Brook Farm group so Brown attempted to create a similar body, terming himself the “main organizer.” Brown, however, finally admitted that although many were interested the plan never went beyond the talking stage. He later briefly formed such a community in New York; however, he learned, as many others have, that all members of such groups do not equitably share the burdens. Brown also made a brief foray into the realm of spiritualism. Although impressed with several psychic demonstrations, he did not pursue this interest very far.

Although Brown remained acutely sensitive to the social and economic problems of his day, more practical problems, such as making a living, confronted him. He simply could no longer devote much time or thought to issues beyond his immediate career. In March 1850 Brown left Boston for Sackett's Harbor, New York, to make a survey for an extension of New York's Rome and Watertown Railway. Once again, however, Brown found himself the victim of an undercapitalized venture. After two years of work for the railroad, Brown emerged with a net loss. It was many years before he returned to railroad work, and then only as a government inspector.

While at Sackett's Harbor, Brown became acquainted with First Lieutenant Ulysses S. Grant, USA, who was stationed at nearby Madison Barracks. Brown wrote, “[Grant] appeared as a quiet unobtrusive young officer with no prophetic manifestation of the extraordinary ability that afterwards characterized him in his conduct of our terrible national catastrophe.”

At this point, in the early-1850s, Brown's financial situation was desperate and he sought new employment: “I made application to the U.S. Navy Department in the hope of again obtaining an appointment in its service--to my great relief this was granted and I was placed on the rolls of the Philadelphia Navy Yard but assigned duty at that of Portsmouth, Va.” He had hardly reported there when he was ordered to the Portsmouth, New Hampshire, Navy Yard to replace his old friend and mentor, Alexander Parris, who had died during Brown's railroad adventures.

During his return to New Hampshire, Brown stayed at the same hotel as Franklin Pierce and became “...intimate with him and enjoying the noble geniality that characterized him.” Pierce introduced Brown to Nathaniel Hawthorne, whom Brown held in high esteem because of the Brook Farm experiment, in which Hawthorne had been active. Pierce was elected President later in that year of 1852. Brown was subsequently ordered back to Portsmouth, Virginia. However, he chose to establish his family residence in Philadelphia. He remained at the Norfolk Navy Yard for the next nine years. The Navy during this period was developing the Norfolk facility into a major naval complex and had much need of a good civil engineer there.

Brown brought his underwater construction experience to Norfolk; and although the muddy waters and floor of the Virginia port were far different from the granite bottom of the New Hampshire estuary, Brown devised practical solutions to the problems encountered in new wharf construction and was soon undertaking major projects. America's first dry dock had been built at Norfolk in 1833 for sailing ships. Brown now had to meet the support requirements of the new steamships to which the Navy was converting. “In addition to the necessity for extending the landing and mooring facilities....new quay walls....a large foundry, a boiler making shop and equipment of heavy machinery were required,” Brown noted. His plans, incidentally, were approved by a board of civil engineers composed of William P. S. Sanger, Brown himself, and First Lieutenant William S. Rosecrans, an Army engineer who would later become a major general during the Civil War.

Although generally happy at his Virginia station, Brown admits to a "...few enemies who made their appearance under the relations they had entered into with the Government; in which my official position obliged me to interfere for its protection against their unscrupulous designs. I hardly need mention that these enemies belonged to the class of unprincipled contractors and speculators whose aim is to prey upon the public interests when opportunity is shown and they imagine its officials accessible to corruption."

The impending Civil War, however, increasingly overshadowed Brown's other problems. Washington, DC, had become a hotbed of intrigue. An unidentified officer advised Brown that the "Norfolk Navy Yard would not long remain a Government yard," and consequently to report "privately" any significant facts. Brown complied by supplying information and also prevented "•..expenditures of the appropriated public funds for the navy yard improvements from being made and applied for the benefit of the enemies of the Union."

Brown, however, was spared witnessing what was to transpire at Norfolk. He was detached from the Virginia station on 21 March 1861 and ordered to Mare Island, California. On 6 May he sailed through the Golden Gate and found himself serving at the Navy's most distant permanent naval facility. It would seem that Brown had been sent because Washington wanted a tried professional on hand to develop the Navy yard -- but for whose benefit? California was an unknown quantity, Brown may have been sent there to improve the facilities for the eventual use of the Confederacy.

Brown was suspicious of the atmosphere he found in San Francisco: "The newspapers true to their instincts of venal profits to be secured by popular taste and opinion, appeared to be hesitating and holding themselves ready for siding this way or that,...the forts and other military positions were commanded by Southern officers,...nearly all of the civil officers at Mare Island were known to be avowed sympathizers with the Southern cause." Brown was heartened by the appointment of a new yard commandant, CAPT William H. Gardner, USN, even though the local secessionists hailed him because he was a Marylander. "Captain Gardner I have always estimated as a full toned honorable man, whose sense of duty as an officer of the Nation placed him eminently above every temptation to invalidate the trust he accepted."

Unfortunately, Gardner's allegiance was later called into question when, unwittingly, he had a magistrate from nearby Vallejo administer an oath of allegiance to the United States to the station personnel, not knowing that this judge was, himself, a leading advocate of secession. Loyal personnel refused to take the oath from this judge considering it to be a mockery. Because of this incident, CAPT Gardner was replaced as commandant. In a short time, those suspected of disloyalty to the Union cause were discharged. In the midst of all this turmoil, Brown was ordered to construct defensive works at the southern end of the island for the mounting of twelve heavy guns.

While carrying out this task, Brown learned of the abandonment of the Norfolk Navy Yard. The new Secretary of the Navy, Gideon Welles, had determined that. the Virginia installation was indefensible. Confusion was rampant in Washington and Welles apparently issued contradictory or vague orders: relieve the threatened yard or destroy it. Neither was done. A relief party did not reinforce the station, but instead made a miserable attempt to destroy it. Five warships were burned to their waterlines, including the USS MERRIMACK, which would later be raised and rebuilt so that it could terrorize Union shipping as the ironclad CSS VIRGINIA. Norfolk's structures were superficially burned; however, the valuable mechanical shops that Brown had designed and constructed remained to serve the Confederacy. The yard's capabilities

were restored within a month and it supplied most of the heavy guns and other ordnance used by the Confederacy on the Atlantic coast.

The arrival of Brown's family in December 1861, provided him some solace; however, a new problem emerged. The station commandant discovered that Brown received a higher salary than he; the commandant subsequently requested that his pay be raised to equal Brown's. The Navy Department chose a somewhat different solution. Brown's pay was lowered to equal that of the commandant.

Brown was miffed at the Navy. “I determined to leave the Navy upon the first opportunity that might be presented wherein engineering services would be appreciated upon their real value and not upon those of a comparison with mere official relation to some other individual.” The opportunity soon came. The Spring Valley Water Company of San Francisco offered Brown the post of chief engineer for the design and construction of a large municipal reservoir. “I accepted this call at a salary in almost ridiculous contrast with the government pay and resigned my position at Mare Island on Sept. 7, 1864.”

Brown stayed on the west coast and several years later, while returning from a construction project in Oregon, learned, through a newspaper report, that he had been appointed Navy Civil Engineer of the Mare Island Navy Yard. “This was a surprise to me as I had not solicited the position. I did not at first feel inclined to accept the place when it was officially tendered.” However “...the importunity of my friends...in urging my compliance...finally prompted an acceptance of the appointment.” He took service at the yard on 13 May 1869. The now 53-year old engineer relished his new office and duties. “With the exception of the more pretentious house of the commandant I was favored with the finest family residence on the island," Brown wrote with pride. Undertaking the renovation of Mare Island, Brown completed a new hospital, powder magazine, ordnance armory, headquarters building and large catchment reservoir. To his great pleasure, Brown was also named a government inspector of the Central Pacific Railroad, which was ultimately to join the Union Pacific at Promontory Point, Utah, creating the first transcontinental railroad. Later, Brown was to serve in the same capacity with the Southern Pacific Railroad.

In 1872 Congress appropriated the first funds to build a stone graving dock at Mare Island. Brown commented, “The work was almost exasperatingly slow owing to the paltry sums annually allocated for it.” The dock took nineteen years to complete. A year after the first appropriation, Brown toured England and France to study the docks at Portsmouth, Chatham, and Cherbourg; he was especially interested in their use of stone masonry.

Brown remained at Mare Island for the next nine years and completed numerous projects. However, the 1881 decision which finally gave Navy civil engineers full officer status also naturally gave the newly recognized officers the right to a Navy retirement. Along with Sanger and others, Brown took advantage of this and retired on 15 October 1881 (the same day Sanger retired) at the age of sixty-five and with the relative rank of lieutenant commander.

He devoted his retirement years to a private engineering practice and to the social and econom1c problems of his adopted state. He decried land speculators and more than once declined lucrative fees for town-site surveys of land located in waterless, desert areas. For a time he shared office space in San Francisco with Colonel John Singleton Mosby, the famous Confederate guerrilla leader and former commander of “Mosby's Raiders.”

As mentioned earlier, Brown was recalled to active duty in 1898 at the age of 82 for the Spanish-American War. Brown served in Washington, DC, as senior member of a board of inspection which had him traveling to the Navy yards in New York, Boston and Portsmouth. After a six-month tour he was released from active duty. Unfortunately, Brown only carried his autobiography through to 1894, so we do not have his impressions of this tour of duty. However, an associate of Brown was informed by his daughter, Hattie, that "...she was so proud of her old father to see him in the uniform of his rank on duty at naval headquarters."

Calvin Brown died on 29 March 1909 at the family residence on Oak Street in San Francisco, California.

CIVIL ENGINEER (CDR) ANICETO G. MENOCAL, USN
AND THE ISTHMIAN CANAL

One of the most renowned Civil Engineer Corps officers of the last century was Aniceto Menocal. Menocal was intimately involved in one of the major engineering feats of the late 19th century, the building of a trans-isthmian canal between the Atlantic and Pacific Oceans. He was born in Havana, Cuba, on 1 September 1836, the son of Gabriel Menocal, a planter, and the scion of an old Spanish family. After receiving his early education in Havana, Menocal came to the United States in 1858 and entered Rensselaer Polytechnic Institute; he graduated in the Class of 1862.

Following his graduation from Rensselaer, Menocal returned to his native land and worked from 1863 to 1865 as an assistant engineer for the Vento Water Works which supplied Havana with its water and as chief engineer in charge of location and construction from 1865 to 1869. In 1866 he married Elvira Martin of Havana.

In 1870 Menocal returned to the United States and was employed by the New York City Department of Public Works for the next two years. In 1872 President Ulysses S. Grant requested that former General George B. McClellan, then the head of the New York City Department of Docks, suggest an engineer to act as chief of a surveying expedition for an interoceanic canal to facilitate U.S. trade between the Atlantic and Pacific Oceans. McClellan recommended Menocal, who was subsequently sent out during the years 1872-74 as chief of an expedition to survey a route across Nicaragua for the proposed canal. The results of the survey were later presented to the 43rd Congress.

The federal government, however, desired additional information on possible canal routes. Thus, Menocal was appointed chief engineer of another surveying expedition, this time to survey a canal route across the Isthmus of Panama, then the most northern province of Colombia. The survey was carried out during 1874 and 1875 and the results reported in an executive document.

These two surveys convinced Menocal that a sea-level canal was not practical in Panama. Menocal favored the construction of a lock canal across Nicaragua because it was the shorter of the two routes, required engineering works of smaller size, and would cost less than a lock canal across Panama. His conclusions regarding cost were born out by subsequent events.

In early 1874, before leaving on his second survey, Aniceto Menocal was appointed a Navy Civil Engineer and assigned to the Washington Navy Yard. Thus, began his Navy career.

Interest in an interoceanic canal continued to manifest itself in every session of Congress. Finally, on 19 April 1879, President Rutherford B. Hayes appointed RADM Daniel Ammen, USN (Chief of the Bureau of Yards and Docks from 1869 to 1871) and Civil Engineer Aniceto Menocal, USN, as delegates to attend an international conference, sponsored by the Geographic Society of Paris, which was being held in May to consider various projects for an isthmian canal. In fact, the conference resulted from the Societe Civile Internationale du Canal Interoceanique du Darien which in 1878 had received a concession from the government of Colombia to build and operate a canal across Panama. The conference, by a vote of its 136 delegates, decided that it was feasible to build a sea-level canal across Panama. This conclusion, however, was protested by eminent engineers familiar with the route selected. After the conference concluded, President Grevy of France made Menocal a Chevalier of the Legion of Honor. The U.S. delegates returned home and provided Secretary of State Evarts with a voluminous report on the conference.

The French subsequently formed the Compagnie Universelle du Canal Interoceanique with the Vicomte Ferdinand Marie de Lesseps, the builder of the Suez Canal, as its president. The Compagnie acquired a concession and began construction of a sea-level canal across the Isthmus of Panama in 1881. The project, plagued by tropical disease, engineering problems, and a shortage of skilled laborers, was to drag on for years before finally ending in failure.

Following his return from France, Menocal became associated with former President Grant, Levi P. Morton, General McClellan, Rear Admiral Ammen, and other prominent men in an organization called the "Provisional Interoceanic Canal Society." In May 1880, Menocal secured for the society a concession from the Republic of Nicaragua for the construction of a canal. The society subsequently merged into a corporation known as the Maritime Canal Company of Nicaragua and Menocal became its chief engineer. However, the failure of the firm of Grant and Ward in May 1884 also undermined the canal company and its concession was allowed to lapse.

Meanwhile Menocal continued to pursue his career in the Navy. In 1881, while Consulting Engineer of the Bureau of Yards and Docks, Menocal designed the Naval Gun Factory which was built in Washington, DC. He was assisted by a young Civil Engineer Corps officer named Robert E. Peary, who would later achieve fame as a polar explorer and the first man to reach the North Pole. Menocal and Peary worked together for some years after Peary's entry in the Navy.

Nevertheless, Menocal's participation in various surveying projects in Latin America continued alongside his naval career. From 1876 to 1884 Menocal carried out several surveys in Nicaragua, which were sponsored by the Nicaraguan government. He performed extensive surveys for improving the harbor at Greytown and the navigation of the Rio San Juan, and for a canal connection between Lakes Managua and Nicaragua, known as the "Tititapa Route."

In 1886, the American Geographic Society became interested in the construction of a trans-isthmian canal and its accomplishment was again considered by a group of prominent Americans. Menocal, meantime, was closely following French progress on their canal project, and prepared a comprehensive report based on his observations.

On 20 February 1887, Congress approved the organization of another Maritime Canal Company of Nicaragua and appointed Civil Engineer Menocal its chief engineer. Menocal obtained a new concession from Nicaragua on 24 April 1887 and one from Costa Rica on 9 August 1888. By 1890, the Maritime Canal Company had finished the location surveys and begun the initial construction work. The company was able to purchase seven large ladder dredges from contractors of the now defunct French Panama canal effort, and by 1892, had built quarters for workers and other facilities at Greytown, Nicaragua. The company also dredged and opened for navigation a channel 500 feet wide and 15 feet deep from Greytown to the previously inaccessible sea. Unfortunately, the financial crisis of 1893 brought work to a halt. Attempts during the Cleveland and McKinley administrations to have the U.S. government take control of the project failed and the canal concessions expired. Further action was delayed by the war with Spain.

Following the cessation of work on the canal project, Menocal returned to the United States. Between 1 March 1890 and 1 July 1893 he had been on furlough; however, on the latter date, he reported to the Navy Yard, Norfolk, Virginia, as its civil engineer. On 30 July 1895 he was assigned in the same capacity to the Navy Yard, Brooklyn, New York. On 30 October 1897 he again travelled to Nicaragua aboard the USS NEWPORT, returning to New York in January of the following year.

During this period Menocal did all he could to secure financial support for the canal project. He took leave and visited Europe twice with this aim in mind; however, although he aroused interest in the project in both England and Belgium, the world financial situation was such that neither country was willing to provide financing.

Failing health and advancing years compelled Menocal to curtail his professional work. Following the end of hostilities with Spain, Civil Engineer Menocal retired from naval service at the age of 62 on 1 September 1898 with the relative rank of commander. Following his retirement, Menocal performed a number of additional tasks for the government. After the Spanish-American War, he was sent to Havana, Cuba, as one of the naval commissioners whose task was to take over Spanish naval property there. Following that assignment, he was, in 1900, sent as a member of a board to establish a naval station at Olongapo in the Philippines. Finally, in 1902, he was sent to investigate the possibility of establishing a coaling station in Liberia.

Menocal's last professional assignment came in 1906 when the Cuban government employed him as chief engineer to investigate flood control in the Roque Valley and irrigation projects in the northern provinces of Cuba.

Aniceto Menocal had a long and notable engineering career, particularly distinguished by his work in the field of interoceanic canals. He left behind a voluminous number of publications on this and other engineering subjects. He was a member of a great many engineering and scientific organizations in both the United States and - Europe and was most certainly a credit to his adoptive country and the Civil Engineer Corps.

Civil Engineer Aniceto Menocal, USN (RET), died on 21 July 1908 in New York City and was buried in Arlington Cemetery. He was survived by his wife and three sons.

One of these sons, Adolfo J. Menocal, born in Havana on 11 May 1867, chose to follow in his father's footsteps and was commissioned in the Civil Engineer Corps on 15 March 1894. In 1914 he was selected for advancement to captain (when the Civil Engineer Corps had only two such billets), but was never promoted; he remained a commander until he retired on 10 May 1921 because of a physical disability sustained while on active duty.

The Menocal family gave yet another generation to service in the U.S. Navy. Adolfo Menocal's son, George L. Menocal, entered naval service in 1922 as a line officer and retired with the rank of rear admiral in 1948.

1898: THE CIVIL ENGINEER CORPS TAKES CHARGE

Although finally granted relative rank and a uniform in 1881, Civil Engineer Corps officers still reported to a line officer who was Chief of the Bureau of Yards and Docks. This remained the case even though Congress had ruled as early as 1871 that staff officers holding the relative rank of captain could be appointed bureau chiefs.

In June 1881, two months after the attorney general made his definitive ruling that Navy civil engineers comprised a staff corps and were Navy officers, COMO Richard L. Law, USN, completed his tour as Chief of the Bureau of Yards and Docks. However, the act of 1871 apparently had no effect on the choice of his replacement because another line officer, RADM Edward T. Nichols, USN, was selected to succeed him.

On 27 November 1882 the ten officers comprising the Civil Engineer Corps, in a highly unusual and unprecedented move, directly petitioned the Secretary of the Navy for redress. The lengthy petition made certain specific points: (1) Civil Engineer Corps officers were recognized Navy officers with relative rank and were fully eligible under the law for appointment as chief of their own bureau, (2) all other bureaus had a professional head appointed from the corresponding staff corps, and {3) because the Chief of the Bureau of Yards and Docks was not an engineer, he lacked the necessary qualifications "requisite for the proper and intelligent discharge of the important duties pertaining to the supervision and direction of the design, construction, repair and maintenance of all the important public work comprising the Navy Yards, which come under the cognizance of this Bureau, and is the legitimate work of this staff corps of the Navy."

The Office of the Secretary of the Navy received the petition on 1 December 1882 and later that month Secretary Chandler sent an official reply to Civil Engineer (CAPT) Peter Asserson, the senior Civil Engineer Corps officer, in which he said that the matter would be given due consideration. Unfortunately, RADM Nichols's reaction to this extraordinary petition went unrecorded.

The matter was duly considered; however, that consideration continued for the next fifteen years and four more line officers were successively appointed as Chief of the Bureau of Yards and Docks. The senior Civil Engineer Corps officer simply served at Bureau Headquarters as "engineering consultant" to the Chief.

Finally, when RADM Edmund 0. Matthews, USN, completed his term as chief in March 1898, Civil Engineer Peter C. Asserson, USN, still the Navy's senior Civil Engineer Corps officer, was asked to become chief of the bureau. This was probably done because the increasing tensions between the U.S. and Spain made the government think that a professional engineer should be at the bureau's helm.

Asserson, however, declined the appointment because he was almost 60 and would have to retire before completing his term as chief. Next in line after Asserson was the very competent Civil Engineer Mordecai T. Endicott, USN, holding relative rank as a commander. Endicott was promoted to the relative rank of captain so that he would be eligible for the post, and on 4 April 1898
was appointed chief. This was a satisfying moment for the ten officers then comprising the corps for eight of them, including Asserson and Endicott, had signed the petition of 1882. The Civil Engineer Corps had finally gained control of its own organization, the Bureau of Yards and Docks.

Upon becoming Chief, Endicott was given the relative rank of commodore, the rank held temporarily by captains who were bureau chiefs. He thus became not only the first Civil Engineer Corps officer to be chief but also the first to attain flag rank. On 3 March 1899, as part of a major Navy reorganization, Congress abolished the one-star grade of commodore and created two pay-grades within the rank of rear admiral. As a result, Endicott also became the first Civil Engineer Corps officer to hold that rank. The same act abolished relative rank so that henceforth Endicott held actual rank as a rear admiral, although he could not be addressed as such. This distinction was eliminated in 1918 when henceforth all officers, both line and staff, were to be addressed by their actual ranks.

It was to take even longer for Civil Engineer Corps officers to win the right to command -- and for this they had to await the creation of the Naval Construction Force, the famous “Seabees.” The original construction battalion concept which was developed during the 1930s called for a unit with dual command: line officers exercising military command and Civil Engineer Corps officers providing technical supervision. RADM Ben Moreell, CEC, USN, then chief of the bureau, recognized that this organization would prove unwieldy and probably unworkable under operational conditions. Consequently, Moreell directly petitioned the Secretary of the Navy to allow Civil Engineer Corps officers to exercise command of construction battalions. The Secretary of the Navy granted this authority on 19 March 1942. However, Civil Engineer Corps officers could only bear the title "Officer in Charge," not “Commanding Officer.” It was only on 23 April 1951 that Civil Engineer Corps officers became 11 Commanding officers11 in name as well as in fact.

CIVIL ENGINEER (RADM) MORDECAI T. ENDICOTT, USN
THE FIRST CIVIL ENGINEER CORPS CHIEF
OF THE BUREAU OF YARDS AND DOCKS

RADM Mordecai T. Endicott was not only the first Civil Engineer Corps officer to be appointed Chief of the Bureau of Yards and Docks, but as such presided over the transformation of the Navy's shore establishment from one designed to support a small wooden-hulled Navy into that capable of supporting the modern steel navy of the 20th century. He also fashioned the means to achieve this end by transforming and enlarging the Civil Engineer Corps.

Mordecai Endicott was born at Mays Landing, New Jersey, on 26 November 1844, the son of Thomas and Ann Endicott and direct descendant of John Endicott, the first governor of the Massachusetts Bay Colony in 1629. Having completed his primary education in Mays Landing, he entered Rensselaer Polytechnic Institute and graduated as a civil engineer in 1868. After four years in the private sector, he was hired in 1872 as a civilian assistant civil engineer at the newly-established League Island Naval Station, Philadelphia, Pennsylvania. Eight months later he was placed in charge of the Civil Engineering Department of the Philadelphia Navy Yard. He remained in that position until 13 July 1874 when he was appointed a Navy Civil Engineer and sent to the Naval Station, New London, Connecticut.

From 1874 to 1890 Endicott served at various navy yards, moving up in relative rank to commander. In April 1890 he became the Consulting Engineer of the Bureau of Yards and Docks in Washington, which placed him in charge of all civil engineering work under the bureau's cognizance. The Consulting Engineer advised the Chief of the Bureau, a line officer, on technical matters. This assignment placed Endicott in a position of extreme responsibility because the shore establishment was in great need of modernization.

Although the construction of modern steel-hulled, steam-driven naval vessels had already begun, the Navy yards were operated and equipped in a fashion reminiscent of a bygone era. Ox-drawn carts still provided transportation in the yards and electric installations for light and power had yet to be introduced. Buildings were built of brick and lumber and dry docks of wood. The day of the steel and concrete navy yard was still to arrive. It fell to Endicott to begin the much-needed modernization. The final decade of the 19th century saw tremendous progress made in all avenues of engineering and industrial endeavor. It was Endicott's task to provide the modern Navy with a modern shore establishment which made use of the latest techniques available in the private sector. Because of the superb engineering and managerial talents that he had displayed during eighteen years of service at the principal Atlantic coast navy yards, Endicott was admirably suited to the task.

During Endicott's eight years as Consulting Engineer, the bureau entered into 110 construction contracts. Among the most outstanding projects, were timber dry docks with stone and concrete entrances for the shipyards at Puget Sound, Washington; New York, New York; and Port Royal, South Carolina; and the design of 40-ton locomotive job-cranes capable of handling the armor plating of the battleships then under construction.

Like other Civil Engineer Corps officers before and after him, Endicott became involved in one of the major engineering projects of the century: the building of an interoceanic canal. On 26 April 1895 President Cleveland appointed Endicott the Navy member of the Nicaragua Canal Commission of 1895. This commission examined the canal route proposed by the Maritime Canal Company on the basis of feasibility, cost, and permanence. The commission's report led

Congress to delay taking action on bills furthering the Nicaragua canal project which was eventually abandoned in favor of the Panama route.

On 19 July 1897 Congress forbade the Navy from paying more than $300 per ton for battleship armor. If armor could not be purchased within this limit, the Secretary of the Navy was authorized to establish a government factory to produce the armor in the quantities needed. Endicott was appointed to a three member Armor Factory Board which proceeded to investigate the design and construction of such a factory. The board's detailed report when presented to Congress so impressed armor manufacturers that lower bids were swiftly forthcoming.

In early 1898, the term of RADM Edmund O. Matthews, USN, Chief of the Bureau of Yards and Docks, was expiring and President McKinley, on the recommendation of the Secretary of the Navy, determined to break with a 56-year precedent by appointing a Civil Engineer Corps officer instead of a line officer to the position. The nation stood on the brink of war with Spain and it was felt that a civil engineer should at last head that Navy bureau most intimately concerned with civil engineering. As mentioned earlier, Civil Engineer Peter C. Asserson, USN, the senior Civil Engineer Corps officer was first offered the position which he declined by reason of age. Mordecai Endicott, the next in seniority with eight years of accomplishment behind him as Consulting Civil Engineer, was clearly the man for the job. On 21 March 1898 Civil Engineer Endicott was promoted to the relative rank of captain and thus became eligible for appointment as chief. On 4 April 1898 Endicott was appointed Chief of the Bureau of Yards and Docks and advanced to the temporary relative rank of commodore. As we learned earlier, he subsequently also became the first Civil Engineer Corps officer to attain the rank of rear admiral.

After serving his first four-year tour as chief, Endicott was reappointed in 1902 for a second tour; and President Theodore Roosevelt reappointed him to a third tour in 1906. Reaching the mandatory retirement age of 62 on 26 November 1906, he continued as chief until 5 January 1907 at the request of the Secretary of the Navy. When Endicott became chief, the Civil Engineer Corps comprised only thirteen officers, a clearly inadequate number to meet the rapidly expanding requirements of the Navy. By the end of his tenure, Endicott had been able to get Congress to fix the number of Civil Engineer Corps officers at 40. Endicott was also instrumental in securing passage of a law in 1906 that required Chiefs of the Bureau of Yards and Docks to be selected only from among Civil Engineer Corps officers.

Mordecai Endicott achieved additional prominence in the engineering profession when he took steps to change the standard design of naval dry docks from timber to concrete and stone. He clearly foresaw that wooden dry docks would not meet the requirements of the modern battleship. Moreover, the higher maintenance costs of wooden dry docks made them less cost effective than those of concrete and stone. Endicott, however, faced formidable opposition from those who wished wood to remain the primary material for dry dock construction.

In the face of this opposition, Endicott convinced Congress to change the design of four dry docks which were about to be constructed from wood to concrete and stone. Eleven dry docks were constructed under Endicott's supervision, two of which were steel floating structures. Of the latter, the DEWEY is the most famous. It far surpassed in size any floating dry dock hitherto constructed and could dock a 20,000 ton vessel.

Once again Endicott was destined to be intimately involved in the interoceanic canal project. In 1905 President Roosevelt appointed Endicott the Navy member of the third Panama Canal Commission, which was overseeing the execution of that vast project. The commission was headquartered in Washington, DC, so Endicott could perform his duties as chief as well as work

on the commission. The fourth commission which would, in 1907, replace the third commission was headquartered in the Canal Zone itself, but it, and Endicott's successor on it, is another story.

During his tenure as Chief of the Bureau of Yards and Docks, Mordecai Endicott always worked to secure the greatest possible economy in the expenditure of public funds. He advocated and finally obtained approval from Congress for the consolidation of all power plants at each of the larger Navy yards into a central station. This resulted in significant savings to the government. He also originated a design for large floating cranes, with a lifting capacity of 100 gross tons, which were capable of handling guns, turrets, boilers, and other extremely heavy objects.

As mentioned above, Mordecai Endicott finally resigned his office on 5 January 1907. However, he remained on active duty in the Navy Department until March 1907, when he was detailed to the Department of Justice as Technical Advisor to the attorney general on suits being prosecuted against the Navy Department. On 30 June 1909, having completed this work, he was relieved of active duty.

Following his retirement, RADM Endicott continued to make his home in Washington, DC; and in 1914 and 1917 he was again called to active duty with the Justice Department in connection with suits against the Navy Department. On 12 October 1917 he was recalled to active duty, this time with the Bureau of Yards and Docks. In addition to various technical duties, he acted at different times as president of four Navy examining boards for appointment of candidates to the Civil Engineer Corps. RADM Endicott's final assignment, as a member of a board which judged individuals worthy for various Navy decorations, ended on 30 June 1920.

RADM Endicott lived in retirement until 5 March 1926 when he died of pneumonia. He was buried with full military honors at Arlington Cemetery.

RADM HARRY H. ROUSSEAU, CEC, USN
AND THE PANAMA CANAL

Like Aniceto Menocal, Harry Rousseau was another Civil Engineer Corps officer who was intimately involved with the trans-isthmian canal project. Rousseau, however, played an essential role in the actual completion of the project. He spent a good part of his career participating in the construction of the Panama Canal.

Rousseau was born on 19 April 1870 in Troy, New York. After being educated in the local public schools, he went to Rensselaer Polytechnic Institute and graduated in 1891 with a degree in civil engineering. Rousseau had excelled during his years at Rensselaer, becoming both a brilliant engineer and an expert mathematician. After a few years' work in the private sector, he was, on 29 September 1898, appointed a Civil Engineer Corps officer with the relative rank of lieutenant, junior grade. Thus, began a most unusual naval career.

While serving at Bureau of Yards and Docks headquarters from 1899 to 1903, Rousseau came to the attention of President Theodore Roosevelt who subsequently selected him as Chief of the Bureau to succeed the retiring Mordecai Endicott. Rousseau was only the second Civil Engineer Corps officer to hold this position. LT Rousseau was selected over five other lieutenants, two lieutenant commanders, two commanders, and two captains. Rousseau returned to Washington from his current posting at the Mare Island Navy Yard, took the oath of office as chief on 5 January 1907, and was advanced to the temporary rank of rear admiral. At the time he was 36 years old and, to this day, remains the youngest officer in the Navy's history to be promoted to rear admiral, as well as the youngest officer to have ever been Chief of the Bureau of Yards and Docks. One final distinction, however, is that he remains the chief with the shortest tenure in office, for forces were at work that would propel him to the site of his greatest challenge -- the Panama Canal.

In 1903 the United States acquired a concession from the newly-established Republic of Panama to build the canal, established the Isthmian Canal Commission to oversee the work, bought the defunct French canal company's equipment, and commenced construction. By 1907, however, work on the canal was stalled. Only 4 percent of the necessary excavation had been completed and, in March, the civilian head of what was now the third Isthmian Canal Commission resigned. Roosevelt, nearing the end of his second term, justifiably feared that the U.S. canal project might share the fate of the earlier French effort, if significant progress were not made. To expedite the project, Roosevelt appointed a fourth commission composed of military men and chaired by Lieutenant Colonel George W. Goethals of the Army Corps of Engineers. Harry Rousseau was among the officers appointed to this commission.

Thus, Rousseau's tenure as Chief of the Bureau of Yards and Docks was short-lived, as short-lived as his claim to the rank of rear admiral. On 15 March 1907 Rousseau tendered his resignation as Chief of the Bureau of Yards and Docks and on 16 March he was officially appointed to the commission. On 25 March RADM Rousseau's resignation became effective and the next day he reverted to the rank of lieutenant.

Arriving at the canal site, LT Rousseau was placed in charge of the Department of Building Construction, Motive Power and Machinery, and Municipal Engineering, which comprised some 10,000 employees. The department provided support to the three divisions responsible for excavation, lock construction, and sanitation. As department head, Rousseau was responsible for meeting the building construction requirements of these divisions. He had to provide housing, hospitals, schools, messing and recreational facilities for the approximately 40,000

Canal Commission employees; maintain all existing and newly constructed facilities; install and maintain all canal construction machinery, including air compressor plants and electrical installations; and provide water and sewage systems, and road paving throughout the Canal Zone.

By 1908 Rousseau's department had accomplished most of the above, mainly due to his talent for managing a greatly diversified organization. In July 1908 the canal project was completely reorganized on geographic lines. Rousseau's department was abolished, and the canal project was divided into the Atlantic, Central and Pacific Districts, each under a district engineer. Each district engineer was responsible for the total effort in his district, not only canal construction, but also all support activities.

Colonel Goethals, as Chief Engineer, divided his staff into three divisions, each headed by an Assistant Chief Engineer. The First Division was responsible for all civil engineering problems, the Second Division for mechanical questions, expenditure oversight, estimate preparation, and cost accounting, and the Third Division for hydrographical and meteorological work, general surveys not included in the purview of the construction divisions, and special investigations assigned by the Chief Engineer. Goethals placed Rousseau in charge of the Second Division

Although he got his half stripe in 1909, LCDR Rousseau still had far to go to recoup the rank held two years before. It also became apparent in 1909 that the canal would be finished. The main concern now became economy: to complete the canal at the least cost. This required the highest degree of funding management and it fell to Rousseau's Second Division to provide it. The division established a series of management methodologies to increase efficiency and better utilize resources. Shops were standardized, personnel strength reduced, and surplus equipment returned for storage and redistribution. Standardization became the watchword throughout the Canal Zone. The effort resulted in annual increases in efficiency-- as much as 25 percent over each preceding year. In 1911 Goethals gave Rousseau an additional assignment: the construction of adequate terminal facilities at Cristobal and Balboa. Since these facilities called for the construction of dry docks, breakwaters, coaling plants and similar facilities, it was only natural that Rousseau, a Navy Civil Engineer Corps officer, should be selected.

The Panama Canal was officially completed in 1914 and Rousseau's position as Assistant Chief Engineer was terminated along with the Canal Commission on 1 April 1914. Secretary of the Navy Meyer requested Rousseau's release because he was contemplating his reappointment as Chief of the Bureau of Yards and Docks. However, Goethals, who had meantime been appointed Governor of the Canal Zone, advised Meyer that Rousseau was indispensable and requested that he remain in the zone as head of the still ongoing terminal construction. Rousseau successfully completed the terminal construction a few months later and returned to the U.S.

By an Act of 4 March 1915, Congress extended its thanks LCDR Rousseau and authorized the President to advance him to rank of rear admiral, which was done effective on that date. The act also allowed Rousseau to retire at 75 percent of his pay should he so choose; however, the 45-year old rear admiral elected to remain on active duty.

On 29 August 1916 RADM Rousseau was named to a commission charged with investigating and reporting on the establishment of additional Navy yards and stations. During World War I he also served as Assistant General Manager and Head of the Shipyards Plant Division of the Emergency Fleet Corporation, Associate Director of the United States Housing Corporation, Manager in Charge of the expenditure of Navy funds for improvement of shipyards having

contracts for Navy vessels, and as a member of the Government Munitions Board. His World War I service earned him the Navy Cross.

Since 1914 RADM Rousseau, in addition to his other duties, had been a director of the Panama Railroad Company and the Panama Railroad Steamship Company. In this capacity, he was on his way to the Canal Zone aboard the SS CRISTOBAL on an inspection trip when he died of a cerebral hemorrhage on 24 July 1930 at the age of 60. RADM Rousseau was buried in Arlington Cemetery with full military honors.

RADM Rousseau's important contribution to the construction of the Panama Canal, one of the most difficult projects in the history of engineering, was further recognized in 1932 when a postage stamp was issued with his portrait on it. He remains the only Civil Engineer Corps officer to have his likeness on a postage stamp as a personal tribute.

RADM ROBERT E. PEARY, CEC, USN
ISTHMIAN CANAL SURVEYOR, ARCTIC EXPLORER, AND EARLY AIR ADVOCATE

The most famous Civil Engineer Corps officer to date remains Robert Edwin Peary. However, Peary an extremely talented man of tremendous drive achieved his great renown not as a civil engineer but as an Arctic explorer. Nevertheless, Peary was not just an Arctic explorer whose goal was to reach the North Pole. He was a first-rate civil engineer who performed his Navy assignments in a meticulous manner. Like many of his fellow Civil Engineer Corps officers, he was involved in the interoceanic canal project, and late in life he became deeply involved in aviation and worked to promote the future of this new means of transportation. Peary was a man of many talents and wide interests, a veritable "renaissance man" who succeeded at whatever he tried.

Robert Edwin Peary was born the only son of Charles and Mary Peary on 6 May 1856 in Cresson, Pennsylvania. His parents had moved there from Maine where the family originated; and after his father's death, when Peary was only three, he and his mother moved back to Maine and settled at Cape Elizabeth. After receiving an education in the local public schools, Peary entered Bowdoin College and graduated in 1877 with a degree in civil engineering.

Peary was driven by a need to excel, to achieve more than the average man. At the age of 24, he wrote his mother that, “I don't want to live and die without accomplishing anything or without being known beyond a narrow circle of friends.” It would take years of dedicated effort, physical suffering and danger before this desire for recognition was satisfied.

The young engineer became a country surveyor in Fryeburg, Maine; the townspeople, however, needed his services so little that he became a justice of the peace and turned to taxidermy to augment his income. He did rather better at mounting birds than he did at civil engineering (robins, $1.50; ducks and hawks, $1.75-$2.25). In 1879 Peary responded to a notice on the bulletin board of the local post office and was appointed a cartographic draftsman with the U.S. Coast and Geodetic Survey in Washington, DC, at a salary of $10 a week.

Although qualifying for a permanent position, Peary did not think that a draftsman's stool was a good place from which to achieve great success. Another government announcement informed him that the Navy Civil Engineer Corps was offering commissions to a “select few.” At the time, a stringent (for the day) physical examination was required followed by the successful completion of a ten day competitive written examination. Although lacking in practical engineering experience, Peary threw himself into the examination with a will, even supplementing the tests with voluntary material of his own creation.

After hearing nothing for two months, Peary read one day in the Washington Star that Robert Edwin Peary had been selected as one of six new civil engineers by the Navy. The year was 1881, the same year that a U.S. Attorney General opinion clearly defined Navy civil engineers as commissioned naval officers.

Civil Engineer Robert E. Peary, USN (holding the relative rank of lieutenant), was assigned to the Bureau of Yards and Docks in Washington, DC. From this first posting, he wrote his mother: “It's different from the Coast Survey. I am 'boss' instead of 'bossed,' have a room of my own, messenger, clerk and draftsman. Have over a hundred men under my control.”

For his first field assignment, Peary was sent to Key West, Florida, as inspector for a new iron pier being built by a civilian contractor. He threw himself into the project with a will. Not liking

the contractor's methods, Peary devised his own and implemented them. He personally dived to inspect the sea bed and developed his own blasting techniques to clear the bottom of debris. About with yellow fever prevented his inspection of the work for a time and when he did return he was so appalled at the lack of progress that he took it upon himself to suspend the project. The bureau subsequently backed up his decision to cancel the contract.

Especially impressed by the young Peary's performance was Civil Engineer Aniceto Menocal, USN, to whom Peary had briefly been an assistant at the Washington Navy Yard, before going to Key West. As mentioned in an earlier vignette, Menocal was deeply involved in interoceanic canal projects and favored a route across Nicaragua. In 1884 Menocal was named the chief engineer of a formal survey of the projected canal route. Menocal named Peary chief of the field party. Peary was the workhorse of the survey. As pioneer and transitman, Peary and his native crew hacked their way through the tropical jungle, climbed mountains, and crossed canyons to bring the survey to a successful conclusion.

Next came an interlude that would shape several decades of Peary's life. Having concluded the canal survey, Peary turned north. In 1886 he read a paper on the inland ice of Greenland which so fired his interest that he read everything available on Greenland. He then obtained six months leave and sailed as supercargo aboard a steam whaler bound for Greenland. Accompanied by a young Danish official, Peary carried out a three-week long reconnaissance of the Greenland icecap, which brought him 100 miles from the foot of the cap to an elevation of 7,500 feet. As a result of this trip, Arctic exploration would dominate Peary's interest for much of the rest of his life.

Following his trip to Greenland, Peary once again became involved in the isthmian canal project. As chief engineer of the private Maritime Canal Company, Aniceto Menocal carried out a second survey of the Nicaragua route in 1887. He chose Peary as his assistant on this venture. Because of the great interest in the project, both civil engineers were granted leave to carry out the undertaking. On this second expedition, Peary was accompanied by a young black man, Matthew Henson, whom he hired away from a hat shop in Washington, DC. Originally employed as a manservant, Henson over the next three decades became Peary's close companion as well as his assistant, and the field manager of Peary's later Arctic expeditions. He also has the distinction of being Peary's sole American companion on the last lap to the North Pole in 1909. Henson was no ordinary stock clerk in 1887; he had already traveled widely as an able seaman with six years sailing experience.

The second Nicaragua survey was a well-funded expedition comprising almost 200 men. Well aware of the dangers of the tropical trail, Peary took every precaution to protect his men. He involved himself in the most minute details of the survey which he brought to a speedy conclusion. Although he thought the Nicaraguan route better than the Panamanian, he was not bitter or surprised when Congress finally chose the latter route because he felt there was need for two canals and that both routes would eventually be used.

Peary's life seemingly took a more conventional turn in 1888 when he married Josephine Diebitsch of Washington, DC, and was assigned as civil engineer for the New York Navy Shipyard. Nevertheless, while engaged in civil engineering projects for the Navy, Peary was also planning another trip to Greenland. Receiving encouragement from the American Geographical Society of which he was a member, he attempted to obtain special orders from the Navy in the way of an official endorsement of the proposed expedition. However, his request for orders, which he made directly to Secretary of the Navy W. C. Whitney, elicited the following response, " the service in which you are about to engage can in no sense be considered naval duty."

In 1890, the Navy transferred Peary from New York to the League Island Navy Yard in Philadelphia, Pennsylvania. It was soon after this move, that the American Geographical Society, Brooklyn Institute, and Philadelphia Academy of Sciences voted to support and fund his expedition to reach the northern end of Greenland by way of the inland ice. Peary secured 18 months leave from the Navy in early 1891; and he, his wife, and a party of six departed for Greenland in June. Peary had the misfortune to break his leg early on; however, the expedition's doctor, Frederick A. Cook, set the leg and Peary hobbled about on crutches till it healed. The following year he carried out the proposed sledging trip to the northern tip of Greenland -- a round trip of 1,300 miles -- which clearly demonstrated that Greenland was indeed an island.

The expedition was a brilliant success and led to a second Greenland expedition and three more years of leave from the Navy. Peary personally helped underwrite the new expedition by going on a grueling lecture tour which raised a total of $13,000 in 103 days. In 1893 Peary, his wife who was pregnant with their first child, and the men of the expedition again went north, this time to explore land north of Greenland and reach the North Pole, if possible. His wife had her child in Greenland, the first Caucasian child born that far north and then departed for home. The winter of 1893-94 was extremely harsh and the party had to turn back after making only 120 miles across the ice cap. The main body of the expedition departed by ship in August; however, Peary and two companions remained behind to make one more attempt at exploration. A year later, after much hardship and little success, they too departed. In 1896 and 1897 Peary again made trips to Greenland. During this period Peary began to set his eye on the North Pole; he decided that the only way to reach the pole was from the north coast of Greenland.

The Navy Department, however, ended further exploration by Peary in the Arctic. In April 1897 Peary was ordered to report to the Mare Island Navy Yard in California. In response, Peary requested a five-year leave of absence so that he could continue his explorations, which included the goal of reaching the North Pole. The Navy refused the request; nevertheless, Peary through an influential acquaintance got President McKinley to personally intercede. Peary's orders were cancelled and his leave granted.

The fact that the Spanish-American War broke out as Peary's departure date neared, did not deter him. He continued his preparations and departed New York Harbor for the Arctic in July 1898. By August, his ship was icebound after crossing Smith Sound, nearly 700 miles from the pole. While establishing and supplying a base on the edge of the Polar Sea, Peary had both feet badly frozen and suffered the amputation of eight toes. He stayed in the Arctic until the fall of 1902 carrying out an extensive exploration of the region and in the spring of 1902 made the nearest approach yet to the pole in the American Arctic, 84° 17' north.

Upon his return, Peary underwent extensive surgery on his feet to permit their fullest use. Through sheer will power he learned to walk without a noticeable limp. Peary, now a commander, was involved in regular naval duties with the Bureau of Yards and Docks for the next few months. Nevertheless, his mind was still on the Arctic, and particularly on reaching the North Pole.

One individual who greatly approved of Peary's devotion to Arctic exploration was Vice President Theodore Roosevelt; and when Roosevelt became President following McKinley's assassination in 1901, Peary's future was assured. No longer would Peary have problems getting leave and acquiring support for his expeditions. The new President had a keen interest in such matters and fully supported Peary's efforts. In September 1903 Peary was given three years leave to pursue another attempt at the pole. A problem in the previous attempt was the lack of a ship

capable of forcing a passage through the ice to a high-enough latitude for a cross-ice polar dash. Peary's Arctic Club raised $100,000 for the expedition and built such a ship, the ROOSEVELT, from the keel up. This time the explorers would use Eskimo methods and clothing, and travel in individual dog sledges.

In July 1905 the ROOSEVELT sailed north from New York and reached the north coast of Grant Land by September. Peary struck out for the pole from Cape Hecla in March 1906; however, after two weeks of travel across broken ice fields, and open leads, the condition of his dogs and his declining food supply forced him and his associates to turn back. Nevertheless, he reached latitude 87° 6' north, 176 miles from the pole, and the farthest north anyone had ever reached.

In July 1908 Peary left on his last attempt to conquer the pole. The ROOSEVELT made it to latitude 82° 30' north, the farthest north for a ship under its own power and on 1 March 1909 Peary set off from Cape Columbia with his close associate, Matt Henson, seven other companions, seventeen Eskimos, 133 dogs and 19 sledges. By the end of March, the expedition had reached the 88th parallel and the last supporting party turned back, leaving Peary, Henson, four Eskimos, and forty dogs to make the final dash for the pole. On 6 April 1909 Peary made observations which indicated that he had reached 90° latitude north, the North Pole. He raised the stars and stripes, hours. Due to excellent weather conditions, the return to Cape Columbia was accomplished at breakneck speed in only 16 days. On 5 September 1909 the ROOSEVELT arrived at Indian Harbor, Labrador, and Peary cabled the news to the world that he had reached the North Pole.

However, Peary triumph was not unalloyed, for he now found himself embroiled in a controversy that would plague him for years. Five days before Peary sent his famous cable, Dr. Frederick A. Cook, the surgeon from Peary's first expedition and an explorer in his own right, announced that he had reached the pole on 21 April 1908! The press and public initially sided with Cook whose claim to have reached the pole almost single-handedly with a small party of Eskimos seemed more dramatic than Peary's carefully crafted expedition. Nevertheless, a committee of experts commissioned by the National Geographic Society found for Peary. Cook and his partisans continued the controversy for some time although his claim finally lost all credibility. Some years later, Cook again achieved notoriety when he was convicted of promoting worthless oil stocks and sent to prison.

In early 1910 a bill was introduced in Congress to recognize Peary's achievement by promoting him to rear admiral and placing him on the retired list with the highest possible retirement pay under existing law. In October 1910 Peary was advanced to the rank of captain and in March 1911 Congress passed the legislation giving the nation's thanks to Peary, advancing him to the rank of rear admiral, and placing him on the retired list.

Although in his mid-fifties and weakened by many years of living under the harshest conditions, RADM Peary still had energy for a new endeavor. In 1913 Peary became interested in the airplane and its potential; and he consulted with the Wright brothers about the possible use of aircraft for exploration and military purposes. In 1916 Peary urged the creation of a Department of Aeronautics to rank equally with the War and Navy Departments. Peary argued that in addition to "...the immediate military emergency [impending U.S. involvement in World War I), the money and effort expended on our air service will all count towards a great peace air service,...the carrying of mails, the transportation of passengers and express material, the lifesaving patrol of our coasts...." Such sentiments, especially his call for a separate aviation department, were not enthusiastically received in the high echelons of the War and Navy Departments. Some individuals, however, including an Army aviator named Billy Mitchell and

members of the prestigious Aero Club of America, did listen. In fact, the latter organization named Peary Chairman of Aeronautical Maps and Landing Places.

Receiving little official support, Peary devoted his full energy to the development of air power, capitalizing on his national stature to enlist public support. He advocated an aerial coast patrol, selecting points along the entire U.S. coastline to serve as bases. He maintained that, “An attack must come upon us by sea. Our coastline as a base gives us inestimable advantage in aerial warfare, and will enable us to send out such veritable clouds of airplanes as would completely overwhelm and destroy any number of airplanes that could be transported on the deck of a hostile fleet!”

Through a 20 city fundraising tour, Peary raised $250,000 for the Aerial Coastal Patrol Fund, which was used to establish four coastal patrols under the independent National Coastal Patrol Commission, an auxiliary of the Navy. The Navy would later build naval air stations at practically the same points advocated earlier by Peary. Upon U.S. entry into World War I, Peary was named Chairman of the National Committee on Coast Defense by Air; he also accepted the presidency of the Aero League of America. An ironic footnote to the story of this Civil Engineer Corps officer prophet of air power was the sinking of the USS PEARY, his namesake, at Darwin, Australia, by Japanese air power on 19 February 1942.

RADM Peary's efforts on behalf of air power further drained his physical reserves. In 1917 he was diagnosed as having pernicious anemia which was, saved by transfusions, untreatable at the time. True to his engineering discipline, he carefully monitored and recorded his vital signs during the inevitable steady decline. He died at his Washington home on 20 February 1920 and was buried at Arlington Cemetery.

RADM Peary's accomplishments as an Arctic explorer go far beyond his 1909 expedition to reach the North Pole. Having been involved in Arctic exploration for almost a quarter of a century, he developed highly efficient methods of exploration, utilizing small parties and Eskimo equipment, dress, and modes of travel. His trips to Greenland resulted in a complete revision of the maps of a large portion of that island. In addition, the sciences of meteorology and hydrography greatly benefitted from his observations in Greenland and on the Arctic icecap. Peary's tidal observations, the most northerly ever made, were of great value to understanding the tides of the Arctic Ocean. Finally, Peary gathered much information about hitherto little known Eskimo tribes which proved invaluable to anthropologists.

The U.S. Postal Service issued a stamp to commemorate Peary's final Arctic expedition of 1909. The stamp, unlike that of RADM Rousseau, honors the entire expedition rather than Peary as an individual. In 1986, a set of Arctic explorers stamps were released. One had Robert E. Peary and Matthew Henson on it. Nevertheless, RADM Peary is the only other Civil Engineer Corps officer to be associated with a postage stamp.

RADM Peary was more than just an Arctic explorer, he was an explorer par excellence, whether in the jungles of Nicaragua searching out the path of an interoceanic canal, in the Arctic dashing for the North Pole, or in the air pioneering a new, revolutionary means of transportation and warfare. RADM Peary, civil engineer, explorer, and aviation advocate, was a genuine twentieth century pioneer.

THE TWELFTH REGIMENT (PUBLIC WORKS) AND THE ORIGIN OF THE SEABEES

The “ancestral home” of today's Naval Construction Force is, oddly enough, located in the Midwest rather than at one of the coastal sites so long associated with the Seabee battalions.

Little resembling the units of World War II fame or today's mobile battalion successors, the first organized naval construction unit, the 12th Regiment (Public Works), was created in 1917 at Great Lake Naval Training Center in Illinois.

The Naval Station at Great Lakes had originally been constructed during the period 1905-1911 and was the first major permanent inland Navy installation. It was designed to accommodate a station crew of 1,500 and was considered the ultimate in design and construction. During World War I, and particularly after the arrival of CAPT William A. Moffett, USN (later to become a rear admiral and Chief of the Bureau of Aeronautics), the station became the prime training facility for thousands of seaman. CAPT Moffett recognized the value of the location outside of Chicago, the hub of the nation, and its potential for rapid expansion. His proposal to expand the station's facilities to accommodate 15,000 men was approved by Secretary of the Navy and the Bureau of Navigation.

Events moved rapidly in the spring of 1917, but not rapidly enough for CAPT Moffett. Men poured into Great Lakes much faster than housing and training facilities could be built. In addition to the 11 training regiments already at Great Lakes, Moffett decided that a 12th training Regiment composed of skilled artisans would be useful for providing vitally needed facilities for his command. Moffett was fortunate in obtaining the professional services of three first-rate Civil Engineer Corps officers as his public works officers whose combined efforts resulted in the unique organization of the 12th Regiment (Public Works).

Although the first of the three public works officers, CDR Norman M. Smith, CEC, USN, had technical control of the regiment, military command was in the hands of a line lieutenant, since Civil Engineer Corps officers were not permitted to exercise command at the time. Smith, who would later become a rear admiral and Chief of the Bureau of Yards and Docks (1933-1937), personally led a recruiting campaign in the greater Chicago area in order to fill the regiment with skilled craftsmen. As commandant, CAPT Moffett controlled the initial assignment of the thousands of recruits arriving at the station. Carpenters, electricians, boilermen, plumbers, surveyors and others possessing construction skills were assigned to the 12th Regiment. Smith, meanwhile, contacted and interviewed professional engineers and journeymen for commissions or petty officer ratings. Several engineers selected by Smith made careers in the Civil Engineer Corps.

In mid-1917 CDR George A. McKay, CEC, USN, relieved CDR Smith as Public Works Officer. Smith became Public Works Officer of the Naval Station, Charleston, South Carolina, where he utilized the same recruiting methods developed at Great Lakes to augment his meager public works staff .CDR McKay proved an excellent choice for Smith’s replacement as he had been the engineer who oversaw the original construction of the Great Lakes naval station.

McKay added his own refinements to the 12th Regiment's organization. McKay would subsequently serve two tours as Assistant Chief of the Bureau of Yards and Docks (1923-1926 and 1930-1934).

During 1917, the 12th Regiment provided a needed military supplement to the numerous private contractors hired to accomplish the station's plant expansion. The newly commissioned Civil

Engineer Corps officers, selected by CDR Smith, oversaw contractor performance and also directed the efforts of the 12th Regiment's skilled craftsmen. As the training center rapidly expanded, detachments from the 12th Regiment were sent to specified camp areas to serve as public works maintenance crews. The bond between Civil Engineer Corps officers and skilled construction workers that would serve so well in a later war was acknowledged by the Civil Engineer Corps emblem that enlisted personnel of the regiment wore on the lower left sleeve of their uniform. Nevertheless, the regiment was not a formally established construction unit, it was an ad hoc unit formed for a particular purpose at Great Lakes.

The 12th Regiment reached its fullest development under McKay's successor. In December 1917 CDR Walter H. Allen, CEC, USN, relieved CDR McKay as Public Works Officer at Great Lakes. CDR Allen, like his predecessors, realized the advantage of a Navy construction force. As mentioned above, Civil Engineer Corps officers did not exercise military command of the regiment, but only technical control during actual work periods. Discipline, administration, military training, and personnel support matters were handled by the unit's commanding officer who was a line officer.

Some naval officers were critical of the 12th Regiment, maintaining that the unit skimmed off valuable artisans for Great Lakes' use at the expense of fleet needs. This, however, was an unfair judgment. The 12th Regiment, like the other 11 regiments, was formed to furnish trained personnel for overall Navy use. However, unlike the other regiments, the 12th Regiment performed its public works mission during daylight working hours and engaged in military training late in the day and in the evenings. In short, the regiment's personnel forewent both leave and liberty to accomplish both operational public works assignments and training assignments. Many of the regiments personnel had ratings required by the fleet and were used to fill ship-crew requirements in the same fashion as their counterparts in the other regiments.

But it was not just for ship-crews that the 12th Regiment provided skilled workmen. Having received a request for 200 men to construct air stations in France, CAPT Moffett responded with an offer of 500 men in an organized unit of officers, petty officers, and seamen. Later, the regiment supplied a force of steelworkers and electricians for constructing the tallest radio towers of the time (820 feet tall) on French soil.

During the war, the Naval Station at Great Lakes expanded to include nine satellite camps named after naval heroes. These were independent facilities containing frame barracks, drill and recreation halls, steam plants, and administration and support facilities. One of these, Camp Paul Jones was unique in that it had been entirely built by its own occupants, the men of the 12th Regiment.

In August 1918 CAPT Moffett was able to report to the Navy Department that his station could now accommodate 50,000 men, and during the summer months an additional 10,000 could be housed in tent cities. In just 16 months obscure Great Lakes had become the nation's major naval training and processing center. The expansion had been carried out under 78 separate contracts at a cost of $17 million plus the not inconsiderable effort of the 12th Regiment.

Benefitting from his predecessors' work, CDR Allen perhaps best recognized the potential usefulness of a Navy construction force. Under his initiative, the regiment became involved in matters reminiscent of the later Seabees. CDR Allen sent an "expedition" to rehabilitate and construct barracks for a patrol force located on the St. Claire River Flats Canal in lower Michigan. The construction group camped on-site, completed its mission, and returned to its

“homeport” at Great Lakes. Another special unit was created in anticipation of heavy Mississippi River flooding, much the same as the disaster relief teams of modern Seabees. CDR Allen also reported with pride that regimental personnel delivered 30 to 40 trucks from Michigan manufacturers to the Navy in New York, “a distance of 800 miles and completed in five days.” Finally, CDR Allen said that “...perhaps the best known of special drafts from the Twelfth Regiment was the railroad party that assembled and operated the trains for fourteen-inch naval guns that did such good work on the battle line in France.”

Nevertheless, the 12th Regiment (Public Works) remained an ad hoc unit formed to resolve a temporary problem. Following the armistice in 1918, the regiment was disestablished. CDR Allen, however, continued to praise the regiment and the value of its underlying concept -- that of a naval construction force. He wrote a detailed account of the regiment's activities which was published in U.S. Naval Institute's Proceedings in 1921. In this article, he particularly expressed the hope that similar units could be formed for future war emergencies and could be used both at home and overseas.

During the 1920s and 1930s the term "construction battalion" appeared in the war plans of the Bureau of Yards of Docks and probably originated with CDR McKay. Norman Smith became Chief of the Bureau in 1933 and probably, given his experience with 12th Regiment, favored the construction force concept as a mobilization contingency. Allen, now a captain, also served in Bureau headquarters in Washington during the 1930s and, in fact, both he and McKay were involved in formulating the Bureau's war plans. Allen was subsequently sent to oversee construction at the Naval Air Station, Sunnyvale, California, which was soon to named "Moffett Field" after RADM Moffett who died aboard the airship AKRON when it plunged into the Atlantic in 1933. Allen, himself, died of a heart attack in 1938. Thus, he did not live to see the creation of the Seabees in the opening days of World War II.

William A. Moffett, Norman M. Smith, George A. McKay, and Walter H. Allen individually and collectively conceived of and organized the 12th Regiment (Public Works) which was unquestionably the forerunner of the Seabees. These men were the prophets of the Naval Construction Force; however, it would take another man, ADM Ben Moreell, and another war, to make such a force a reality.

TALL TOWERS IN FRANCE

Before World War I the Navy had been named the exclusive agent for U.S. government radio operations because of its pioneer interest in long range communications. When war broke out, fleet expansion and a concurrent expansion of the then small radio communications network was imperative.

Prior to U.S. entry into the conflict, the Bureau of Yards and Docks had constructed towers and transmitter sites with structures, utilities, and personnel support facilities for the Bureau of Engineering. New high-powered stations became operational at San Diego, California; Cavite, the Philippines; and Pearl Harbor, Hawaii, almost simultaneously with the declaration of war. These stations each consisted of three 600-foot triangular steel towers with attendant facilities. Shortly after the declaration of war, a four-tower installation became operational on the Severn River, across from the Naval Academy. This last communication station was billed as the "second most powerful radio station in the world" -- the most powerful of the time being that of the American Marconi Company at Brunswick, New Jersey. More powerful station were, however, yet to come.

In the latter part of 1917 General John J. Pershing, commander of the American Expeditionary Forces in Europe, requested that a mammoth communication station be constructed in France. The AEF commander was concerned that existing stations either were overloaded or could be easily interrupted by enemy jamming. In similar fashion, Pershing thought the transatlantic cable was particularly vulnerable to German undersea attack.

In response to General Pershing's request, the Bureau of Yards and Docks designed what was to become the largest radio installation of its kind. Eight 820-foot towers were to be constructed at Croix d'Hins1 a site 14 miles southwest of Bordeaux. The project was also to introduce the use of a naval construction force for such projects, a force which was the forerunner of the modern Seabees. This came about when the French government vetoed the use of American contractors because of the great wage disparity between contract employees and those in the local labor market. The French also believed that the construction should be carried out by personnel under military discipline. The U.S. Navy agreed and a search began for naval personnel with the necessary steel working and electrician skills. Such men were readily found as members of the 12th Regiment (Public Works) at the Naval Station/ Great Lakes, Illinois, where they had been employed in building the facilities needed to house and train the thousands of recruits pouring into the station.

Although the radio transmitters and antenna installation were the responsibility of the then Bureau of Engineering, an eleven-mile electrical transmission line was designed and built the camp which would house the construction crews; it consisted of 20 barracks, a mess hall, specialty warehouses, a refrigeration plant, a laundry, and even a small hospital.

Logistics and language proved a problem inasmuch as German submarines still prowled the English Channel and the rudimentary French spoken by the Americans proved tres amusant to their hosts. The French, no novice tower builders themselves, supplied technical experts and expediters to clear the tangle of red tape created by the two governments. When the magnitude of the project became apparent, the station was renamed the "Lafayette Radio Station•• by Presidential direction; it had initially been unofficially called the "Liberty" radio station.

When the armistice was signed on 11 November 1918, four of the towers were nearing completion -- incredibly without the loss of a single life or even a serious injury. Although the

war had ended, the French wished the station completed for postwar use and requested that U.S. Navy management of the project continue. The Bureau of Yards and Docks, confronted with rapid demobilization of its uniformed work force, contracted, now with French concurrence, an American construction firm to complete the project. The camp, still under Navy administration, was occupied by contract workers who termed its amenities "ideal." Although the contract called for completion of the project by 14 January 1920, the Civil Engineer Corps officer in charge of construction turned the completed station over to French government representatives on 1 December 1919, 44 days ahead of schedule.

REMEMBER OLD “MAIN NAVY”
IT WAS ALMOST LOCATED ELSEWHERE

As inconceivable as it might now appear, the entire State, War (now Army), and Navy Departments were once housed in the present-day Executive Office Building, immediately to the west of the White House. Its style, “Second Empire,” might be better described as “early stone wedding cake.”

Although the grotesque structure was still occupied by senior military officials until the outbreak of World War I, the majority of staff offices had long been dispersed throughout the District of Columbia. Entry into World War I made physical consolidation of these office an urgent necessity. The first site combining War and Navy Department needs proved unsatisfactory and an additional site for the Navy and an overflow building for War Department use was sought by the Bureau of Yards and Docks.

The project became the World War I equivalent of the Pentagon and years later, when that massive structure was under construction, the similarities became even more apparent. The importance of the work demanded top-level administration, a job which fell to the then Assistant Chief of the Bureau of Yards and Docks, CDR Archibald L. Parsons, CEC, USN (who would later as a rear admiral be Chief of the Bureau from 1929 to 1933). Parsons envisioned a three story building with 60-foot parallel wings extending to a depth of 500 feet and connected with a frontal building of executive offices. The War Department having found its new quarters short of space requested that the Navy expand the plans to include an additional structure to accommodate War Department personnel. The Bureau went back to the drawing boards and produced designs for two similar structures which were subsequently presented to Congress for approval. In essence, the structures were identical except that the Navy Headquarters would have nine wings and the Army Headquarters (later known as the “Munitions Building “) would have eight. The buildings would be separated by a 100-foot roadway, but connected above by a bridge corridor. When built, the new building complex would be termed the world's largest office building, boasting 1,800,000 square feet, or 41 acres of floor space.

But where to put the new building complex? Time was of the greatest importance because the U.S. had now become a full participant in the war and was rapidly expanding the size of its armed forces which meant a rapid increase in headquarters personnel who needed office space. The exigencies of war allowed circumvention of the Fine Arts Commission which normally controlled the placement of new edifices within the boundaries of the District of Columbia. And although Congress only authorized the complex as a 11 temporary construction,11 the reinforced concrete called for in the design placed it in the “intermediate” or “semi-permanent” category.

Informal site surveys were undertaken “afoot and by motor” and several choice sites were selected. Preliminary plans were actually drawn for occupancy of the Ellipse. Others favored the northwest corner of the Washington Monument grounds. As it was, the site selected was the lesser blow to Pierre L'Enfant's aesthetics, at least for the moment. The site picked was the corner of “B” Street (Constitution Avenue) and 17th Street, which was known as “Potomac Park.” Assistant Secretary of the Navy Franklin D. Roosevelt, is given credit for obtaining Presidential approval of for this site.

However, the nation was at war and -- not withstanding later criticism of the site -- credit must be given to the Bureau of Yards and Docks and its Civil Engineer Corps officers for making the project a reality. The Navy awarded the contract to the Turner Construction Company of New York and work began on 25 February 1918. For the first time in the Navy's history, the

preliminary plans included automobile parking, consisting of a macadamized area to accommodate 500 vehicles placed at the rear of the building.

The general contractor employed as many as 3,400 employees during the peak months of construction. The contractor's main problem was the transience of the common labor gangs which accounted for a total number of 7,500 laborers employed on the project. even months after ground breaking, the first Navy and War Department occupants moved in; full occupation of the complex was achieved in early October 1918. The Bureau reported with pride the modern conveniences included in this "temporary" structure: ice water fountains, linoleum floor covering, and concerning the structure itself, “enduring materials and permanent footings.” A month after full occupancy was reached, the 15,000 employees assigned there cheered the end of the war on Armistice Day, 11 November 1918.

Like so many other “temporary structures” in the government, the wartime emergency building, known as “Main Navy,” was to remain in use for decades, in spite of the complaints of the Fine Arts Commission and thousands of Washingtonians who objected to its squalid appearance near one of the nation's most hallowed shrines. Finally, President Richard M. Nixon gave orders to “get rid of that monstrosity.” Nevertheless, monstrosity or not, “Main Navy” remains a major engineering achievement of the First World War era.

THE CIVIL ENGINEER CORPS AND THE "SPACE PROGRAM" OF THE TWENTIES

What was a naval officer doing, dressed in a fleece-lined jacket and Levis, trekking across the half-frozen cattle ranges of northern Texas in mid-December 1919? He was being a good sailor and obeying orders that carne directly from the Acting Secretary of the Navy.

Although World War I had ended the previous year, the young officer was completing an assignment relating to a high-priority wartime project, one that would aid the U.S. in the postwar development of aircraft -- more specifically airships. It was ironic that he should be furthering air development at ground level, his own two legs his only mode of locomotion.

LT Ira P. Griffen, CEC, USN, as his orders read, was "...to personally walk the length of the pipeline making notes on blueprints" to assess damage claims the property owners might have against the government as a result of construction. The pipeline in question ran from Petrolia, Texas, to an unusual gas processing plant in Fort Worth. LT Griffen had previously participated in the construction of both pipeline and plant by the Bureau of Yards and Docks.

The recent war had seen airplanes introduced in force, but mainly as short range weapons. It was the airship, or zeppelin, that appeared to have the greatest potential as a long-range air weapon. Not only had the Germans used airships to bomb London, but one of their airships, the L.59 flew a non-stop 4,000-rnile round-trip from Bulgaria (an ally) to the German colonies in southern Africa carrying 15 tons of cargo. In an era when airplanes were mostly small and short range, the airship with its great range and carrying capacity appeared to be the strategic air weapon of the age.

Nevertheless, airships had one major disadvantage: their lift was provided by hydrogen, a highly flammable gas that made them very vulnerable to both attack and accidents.LT Griffen's "long march" was part of the acquisition of an alternate, safer gas for lighter-than-air ships: helium. As it happened, the U.S. had the world's only known source of helium. The natural gas secured from the Petrolia gas field had a very high helium content. After extraction, this gas would be piped to a government-owned processing plant in Fort Worth. With a readily available supply of nonflammable helium, airship development seemed assured in the days following World War I.

The U.S. Helium Production Plant, as it became known, was initially funded by the War and Navy Departments; however, the Bureau of Yards and Docks oversaw construction of both plant and pipeline. The Bureau of Engineering through a contract with Linde Air Products, Inc., operated the plant after completion. Built at a cost of $3.5 million, the plant enabled the U.S. to enjoy an international monopoly of helium. The plant produced 40,000 cubic feet of helium a day and was the sole source of the gas until richer fields were subsequently discovered -- also in the U.S.

In 1919 the future looked bright for airships and, indeed, for much of the 1920s and 1930s the airship appeared to be the bright star in aviation's sky -- both as a commercial carrier and air weapon.

The Navy had originally gotten involved with lighter-than-air aircraft when it ordered 16 small, non-rigid airships for maritime reconnaissance and submarine-spotting. Between 1917 and 1919 the Bureau of Yards and Docks built eight steel-frame hangars for these airships at naval air stations along the Atlantic Coast, at Coco Solo in the Canal Zone, and at San Diego, California. These small hangars were built from a standard design produced by the bureau's design

personnel just before American entry into the war. This represented the Bureau of Yards and Docks' first involvement with airships. Most of the World War I hangars were dismantled in the early 1920s because of postwar budget cuts, or were demolished in the 1930s because of deterioration.

In the early-1920s the Army was also involved in airship development; it designed and operated the RS-1, a semi-rigid airship. The Army, however, abandoned airship development to the Navy following the loss of the Italian-built ROMA at Langley Field, Virginia, in 1922. A sudden squall forced the ROMA into high-tension lines and the hydrogen-filled airship exploded, killing 34 of its 45 man crew. This incident resulted in a national policy decision that only helium would be used as the lifting agent in U.S. airships. At the time LT Griffen's pipeline and helium plant had only just begun operation and most of its- rare product had thus far been used only in observation balloons and decompression chambers for deep-sea divers.

After the ROMA disaster, the Navy took the lead in airship experimentation and development in the U.S. There was no doubt that Navy men developed an emotional attachment to airships, after all they had a bridge and wheel and sailed through the air, performed best with the least hazard over the oceans, had a substantial crew, a full galley and mess, enlisted and officer quarters, and were vehicles to which nautical terms could readily be applied. The Navy viewed the airship as its potential long-range, strategic air weapon. So, with the U.S. controlling the world's supply of helium and possessing the necessary technological and industrial capacity, and having a supportive public, the Navy went ahead to build and operate the biggest and safest airships yet seen.

In late summer of 1919 the Secretary of the Navy approved the construction of an airship based on the German airship L.49, which had been captured during the war. The new vessel would be the first rigid-frame airship constructed in the U.S. The Navy acquired Camp Kendrick, New Jersey, from the Army, and, on 28 June 1921, commissioned it as the Naval Air Station, Lakehurst. The Bureau of Yards and Docks then designed and built a huge airship hangar there in which the airship would be assembled. This enormous structure was an engineering marvel at the time. It was 961 feet long, 350 feet wide and 200 feet high. The steel frame of the hangar was covered by corrugated asbestos composition which in appearance resembled corrugated sheet metal roofing. Asbestos was used because of the fire danger inherent in hydrogen which at the time was still the main lifting gas. Unlike metal, the outer covering required no paint, was impervious to the elements, and had an extremely low rate of heat conductivity. The doors of the hangar were not an integral part of the structure. They were operated by enormous counterweights and mounted on rollers. These rollers ran on rails which were parallel to the ends of the hangar. Each door was operated by four 20-horsepower motors, weighed 2,700 tons, and when opened could admit the largest airships then in existence.

The Navy's new airship was completed in late summer of 1923, and was christened the SHENANDOAH. The SHENANDOAH had its home port at Lakehurst and made many sorties before going on what was to be her last flight in 1925. On 3 September of that year she was caught in vertical wind currents over Ohio and broke up with a loss of 14 crewmembers. It was determined that structurally she was too weak because she had been copied from a wartime airship in which strength had been sacrificed for lightness.

The history of the Navy's next airship was dramatically different from that of the unfortunate SHENANDOAH. In 1924, as part of a war reparations agreement, Germany built and delivered a zeppelin to the U.S. government which was subsequently christened the LOS ANGELES. Between 1924 and 1932 the LOS ANGELES made 331 flights, a total of 5,368 air hours, cross-

country and participated in naval exercises in both oceans. The longest flight was from Lakehurst, New Jersey, to the Panama Canal Zone and back. After a long and successful career, the LOS ANGELES was decommissioned in 1932 and finally scrapped in 1938.

Congressional and Navy enthusiasm for airships, engendered in part by the enviable safety record of the LOS ANGELES, led to the signing in 1928 of a contract with the Goodyear Zeppelin Company of Akron, Ohio, for the construction of two super airships. The manufacturer was to construct a monstrous hangar in which to assemble the giant vessels; and the Navy would construct the hangar facilities where the ships would be based.

Goodyear's assembly hangar was to be 1,000 to 1,200 feet long and have a top clearance of 160-180 feet, since the new airships would be 785 feet long and 133 feet in diameter. The already existing hangar at Lakehurst could house the LOS ANGELES and one of the new ships simultaneously; however, by 1928, the Bureau of Yards and Docks recognized that there was room for great improvement in the Lakehurst design. In short, the Civil Engineer Corps and the bureau set out to build the biggest and most modern airship hangar yet constructed

Goodyear was to deliver the first of the new airships within 30 to 35 months and the second within 50 months. Since Lakehurst could already handle one ship upon delivery, the Bureau of Yards and Docks had four short years to design, build and have the second hangar ready for use. The Navy decided to base the second airship at a west coast location and so the site selection for the new hangar and attendant facilities got underway. On 1 June 1929 Secretary of the Navy Charles F. Adams appointed a board of officers to recommend west coast sites for the new hangar. The board members were RADM William A. Moffett, USN (of Great Lakes and 12th Regiment fame), Chief of the Bureau of Aeronautics; RADM Joseph M. Reeves, USN, Navy general board member; CDR Garland Fulton, CC, USN, Bureau of Aeronautics; LCDR Charles E. Rosendahl, Commanding Officer of the LOS ANGELES; and LCDR Edward L. Marshall, CEC, USN, member and recorder.

The general board directed the site selection board to limit its choice to the Los Angeles-San Diego area; and Camp Kearney, near San Diego, seemed to be a foregone conclusion. It had a strong Navy presence, community and local political support for expansion, and the land in question was already mostly government-owned. Other communities, however, also entered the competition to be the site of the proposed lighter-than-air facility. Most notable was San Francisco and its satellite communities. The Chamber of Commerce there offered a substantial acreage near Sunnyvale to the Navy for the legal token of one dollar.

In view of the stricture to select a site only in the Los Angeles-San Diego area, the board did a strange thing: it recommended the Sunnyvale location by a vote of four to one. The lone dissenter, CDR Fulton, opted for the Camp Kearney site. Secretary Adams, in spite of the majority vote, reversed the decision and selected Camp Kearney. Congress became involved in the selection which was delayed almost a year before Sunnyvale was finally approved in December 1930 as the site for the new west coast airship facility.

On 8 August 1931 Mrs. Herbert Hoover christened the newly-completed AKRON before a quarter of a million people at the Goodyear Zeppelin Company in Akron, Ohio. The airship was immense, far exceeding her German counterparts in size, lifting power, and above all, in safety. Her helium filled cells permitted innovations previously unthinkable. The German zeppelins had external engines to reduce spark danger; the engine gondolas, however, created drag and educed air speed. The AKRON had internal engines driving external propellers via belts. The propellers could be rotated 90 degrees from the horizontal to the vertical in order to provide additional lift

and reversed to increase descent. The internal placement of the engines also facilitated servicing while underway.

As mentioned earlier, the new airship had its home port at the Naval Air Station, Lakehurst, New Jersey. The Bureau of Yards and Docks had completely modernized the landing and hangar facilities at Lakehurst.One of the most difficult and dangerous flight operations was berthing because unexpected ground winds could push the airship into the hangar sides while it was entering. Docking to a high mast was equally perilous because down and updrafts could rapidly elevate or drop the stern. During landings, the airship dropped long lines and a large ground crew walked the ship into its hangar.

Civil Engineer Corps officers studied the problem of airship berthing and developed several ingenious modifications to the berthing facilities. The 171 foot high mast was replaced by a stub mast, approximately 60 feet high. The shortened mooring tower footings were mounted on railroad tracks 40 feet apart and the tower became self-propelled -- using a central powerhouse mounted on crawler treads. Side and stern stability was added by use of low profile locomotives especially designed for the task. Both static and mobile mooring masts were surrounded by a circular trackage with rail-mounted trucks that permitted the ship to always face windward in order to prevent turbulence. This innovation reduced the need for large landing crews and eased the task of hangaring the craft.

At the Sunnyvale site, the Civil Engineer Corps officers of the Bureau of Yards and Docks planned to build the biggest and best airship terminal yet seen. Through consultations with air crew personnel and aeronautical engineers, the bureau evolved several proposals: a huge circular hangar on tracks that could be exactly positioned into the wind; a cross-shaped hangar with four entry ways; or an open-ended hangar similar to that built by Goodyear at Akron. Some of the individuals concerned favored a 16 to 24 sided building with openings on six or eight faces. Such a structure could house two large airships and several small ones and would permit an airship to be walked to the appropriate exit within the enclosed still-air area.

Prevailing winds in the Sunnyvale area and economic considerations finally led to the choice of an Akron-type hangar and work was soon underway. The new hangar would be 1,000 feet long and 180 feet high and would have doors of a hemispherical shape carried on tracks on the ground. The doors were so arranged that, when open, they would fit snugly around the hangar sides to eliminate eddy currents as much as possible -- a problem with the doors of the Lakehurst hangar. The door design was similar to that used on a World War I German hangar. For the Civil Engineer Corps, construction of the big hangar was a "glamor" activity, a major project akin to Trident submarine base construction in the 1970s and 1980s.

Meanwhile, the first of the new airships, the AKRON, entered service at Lakehurst. However, after some fifty flights, disaster struck. On 3 April 1933 the AKRON crashed in the Atlantic Ocean; 75 of 78 crewmembers were killed, including RADM Moffett! The tragedy initiated a heated controversy over the safety of airships. While work continued on the Sunnyvale facility and while the AKRON's sister ship, the MACON, neared completion, airship critics attacked the whole airship concept reminding the public of the loss of the Navy's first airship, the SHENANDOAH.

Following a christening by RADM Moffett's widow at Akron, the MACON was officially commissioned at Lakehurst on 23 June 1933. Congressional hearings on the feasibility of airships were underway at the time and it was up to the MACON to restore public confidence in lighter-than-air ships. The Navy purposely scheduled a number of flights over metropolitan

centers to expose the huge airship to as many people as possible. Unfortunately for airships, in 1935 disaster struck the MACON after she had successfully participated in naval maneuvers. A rain squall off Point Sur, California, sent the MACON into an uncontrolled descent into the sea. The airship was destroyed; however, only 2 of its 81 man crew were lost. The loss of the two sister ships ended U.S. pursuit of air power through airships. The sole remaining monuments to the brief but exciting adventure of the airship are the two hangars, one located at Lakehurst and the other at Sunnyvale. In themselves, these structures represent major engineering achievements.

While the loss of the AKRON and MACON effectively ended the era of large military airships, the Navy continued to operate lighter-than-air craft until 1964. These airships were the much smaller non-rigid "blimps" of World War II fame which were use very effectively for antisubmarine patrol and convoy escort. The approximately 150 blimps in service at the end of the war operated from bases in the continental U.S., the West Indies, Morocco, and Brazil. The Bureau of Yards and Docks had to provide the hangars and other support facilities for these airships -- and this led to some extraordinary engineering developments.

In the U.S. alone, the bureau built eight new lighter-than-air stations during the war. The bureau had originally planned to build the blimp hangars of steel; however, construction of only two new steel-frame hangars was underway before U.S. entry into the war created a severe steel shortage. Because of this shortage, the bureau undertook to design an all-timber airship hangar, which would use wood even for structural members. The design was a great engineering challenge, for in the early 1940s no clear-span building of such huge dimensions had ever been constructed with an all-timber frame. Nevertheless, a team of engineers led by Dr. Arsham Amirikian, the bureau's Chief Engineer, labored hard on the project during 1942 and by September had completed the design for an all-timber hangar, featuring braced-wood, hingeless, parabolic-arched trusses. The completed hangar would be 1,000 feet long, 170 feet high at the crown, and 296 feet wide at ground level. The head of the design division, under whom Dr. Amirikian worked, was CDR Emil H. Praeger, CEC, USNR. Before the war, CDR Praeger had been Chairman of the Civil Engineering Department of Rensselaer Polytechnic Institute. During World War II the bureau built 17 of these hangars at various locations, some of which are still standing and in use.

Thus, the Civil Engineer Corps not only played a major role in the grand experiment with airships during the 1920s and 1930s, but also provided the facilities necessary to support the large blimp fleet of World War II.

ADM BEN MOREELL, CEC, USN
FOUNDER OF THE SEABEES AND SHAPER OF THE MODERN CIVIL ENGINEER CORPS

ADM Ben Moreell is the single most important Civil Engineer Corps officer in the history of the corps. He was Chief of the Bureau of Yards and Docks during the most challenging period in the history of the Navy and Civil Engineer Corps -- World War II. Through his personal initiative, an effective naval construction force, the Seabees, was created and the power to command this force was given to Civil Engineer Corps officers.

Ben Moreell was born in Salt Lake City, Utah, on 14 September 1892, the son of immigrant parents, Samuel and Sophia Moreell. When he was two years old, his parents moved to New York City, and four years later, the family settled permanently in St. Louis, Missouri. The father, Samuel, worked at various occupations there including those of dyer, deputy sheriff, and leather merchant. The mother, "Sophie," was self-employed as a dressmaker.

Ben Moreell's gifts and drive manifested themselves early. Having completed his primary education in only six years, Ben went to work during the summer in a shoe factory at the age of twelve; he made $3.00 a week. To augment his earnings at the factory, every Sunday morning he got up at the crack of dawn to sell newspapers. His mother, who loved reading, urged her son to read as much as possible. Ben and his sister haunted the second hand bookstores and it was said that they were thrown out of more of them than anyone one else in St. Louis.

Ben Moreell attended St. Louis's Central High School, taking five subjects during each of the first two years and six during the last two. Not satisfied with that, he stayed after school twice a week to do additional work in college algebra and Latin. Ben, however, was not just a bookworm; he was also intensely interested in athletics. His father, Samuel, was so dismayed by the fact that young Ben played ball every day after school that he predicted his son would flunk. His father was a hard taskmaster when it came to education. When Ben brought home a report card with seven "A"'s and one "B", the father exclaimed, "Doch ein B!" (Nevertheless, one "B").

At sixteen, Ben Moreell graduated at the head of his class and was awarded a four-year scholarship to St. Louis's Washington University. In college Ben was both a brilliant student and an outstanding athlete -- and he did this while also holding down a job to supplement his scholarship. His interest in athletics was so great that Ben Moreell was both captain of the track team and fullback of the football team. He was especially renowned for making a 70-yard run to tie up a game against Missouri, and the local newspapers fondly referred to him as "Benny." While at Washington, he was elected a member of two honors fraternities, Tau Beta Pi and Sigma Xi. He graduated in 1913 with the degree of Bachelor of Science in Civil Engineering.

Following graduation, Ben Moreell took a job as Resident and Designing Engineer on construction projects for the St. Louis Department of Sewers; he held this position until 1917. In that year he took a competitive examination for a commission in the Civil Engineer Corps. In June, shortly after the U.S. entered World War I, he was commissioned a lieutenant, junior grade, and, following a brief indoctrination course at the Naval Academy, began his career as assistant to the Public Works Officer of the New York Navy Yard.

In October 1917 Moreell was advanced to the temporary rank of lieutenant. A short time later, in January 1918, he became an aide on the staff of the Commander, Azores Detachment, Atlantic Fleet, with additional duty as the Public Works Officer of the U.S. Naval Base at Ponta Delgada, San Miguel, the Azores. He served in this capacity until May 1919.

While in the Azores, LT Moreell is reputed to have very favorably impressed the Assistant Secretary of the Navy, one Franklin D. Roosevelt. Roosevelt called on Moreell, who was ill at the time, to commend him for his excellent work in building gun emplacements.

From June 1919 until September 1920 Moreell served as the Civil Engineer Member of the Plant Board, headquartered at Quincy, Massachusetts, with collateral duty as the Plant Engineer of the U.S. Destroyer Plant at Squantum.

Ben Moreell's next assignment took him out of the U.S. and placed him in a position that required both diplomacy and technical expertise; in September 1920 Moreell became Principal Assistant and Executive Officer to the Engineer in Charge, Department of Public Works of the Republic of Haiti. Following a period of anarchy which culminated in the death of the Haitian president at the hands of a mob in 1915 and the landing of U.S. Marines from the USS WASHINGTON, the U.S. occupied and governed Haiti for 19 years. During this period, U.S. personnel ran the various departments of the Haitian government and built an effective infrastructure to serve the Haitian people after the U.S. departure. Moreell served under CDR Archibald L. Parsons, CEC, USN, who had been appointed Engineer in Chief in August 1920. Parsons would later be Chief of Bureau of Yards and Docks from 1929 to 1933. During the four years that Moreell spent in Haiti he became proficient in French, a skill that he would maintain and use throughout his career. The Haitian government awarded Moreell the Order of “Honneur et Merite” (grade of “Commandeur”) for his exceptional service there. The government also awarded CDR Parsons and LT Moreell two other special medals for their service.

From 1924 to 1926 Moreell served as Principal Assistant, and later as Public Works Officer, at the Norfolk Navy Yard, Portsmouth, Virginia. While serving at Norfolk, Moreell was promoted to lieutenant commander, effective 4 June 1925. In June 1926 he was designated Assistant Design Manager of the Bureau of Yards and Docks in Washington, DC. However, just prior to this assignment an event took place which could have changed the history of the Civil Engineer Corps as well as that of the nation: LCDR Ben Moreell decided to resign from the Navy.

For some years previous to 1926, LCDR Moreell had had a problem with a high blood-sugar level. He controlled it by diet while in Haiti, but had apparently decided that it would adversely impact his hopes for a Navy career. In March 1926 he submitted his resignation from the Navy; however, following an exhaustive physical examination, focusing on his specific problem, he was informed that his condition would not adversely impact his naval career. He, therefore, withdrew his resignation in April 1926.

While serving as Assistant Design Manager at the bureau, Moreell wrote Standards of Design for Concrete in his spare time (the book was published in 1929). This work was praised as one of the most outstanding treatises on concrete and was favorably received throughout the engineering profession, both in the U.S. and abroad.

In June 1930 Moreell became the Public Works Officer of the Navy Yard, Puget Sound, Washington, and of the Thirteenth Naval District, Seattle, Washington. In this capacity, he handled a large emergency construction program with outstanding results and received a commendation from the Navy Department.

In June 1932 Moreell was selected to attend a special course of instruction at the Ecole des Pants et Chaussees in Paris in order to study European engineering, design, and construction practices. This selection was a real privilege for a young Civil Engineer Corps officer and Ben

Moreell's knowledge of French from his Haiti days as well as his exceptional career performance probably had much to do with his selection.

After completing the course and returning from Europe, LCDR Moreell reported in June 1933 for a second tour as Assistant Design Manager of the Bureau of Yards and Docks. As such, he had personal supervision over the design of the new Ship Model Testing Basin at Carderock, Maryland {later named the David W. Taylor Model Basin). It was during this period that Moreell applied some of what he had learned in Paris in writing his treatise "Articulations for Concrete Structures." The American Concrete Institute awarded him the Wason Medal for this work. In May 1935 Moreell was made Project Manager of the bureau's Shipbuilding and Repair Facilities, Storage and Submarine Base Section; and the following month he was promoted to commander. In August 1937 CDR Moreell became the Public Works Officer of the Navy Yard, Pearl Harbor, Hawaii, with additional duty as Public Works Officer of the Fourteenth Naval District.

In the closing months of 1937 RADM Norman Smith's term as Chief of the Bureau of Yards and Docks was coming to an end. Many perceptive individuals recognized that the United States could be involved in a major war within a few years and thought it imperative that the Bureau of Yards and Docks have a relatively young and energetic chief who would be able to carry the load and act decisively and quickly. Story has it that two former chiefs prevailed directly upon President Roosevelt to select CDR Ben Moreell the next chief. Whatever the truth of this story, Ben Moreell was selected to succeed Smith. In December 1937 CDR Moreell officially became Chief of the Bureau of Yards and Docks and was advanced to the temporary rank of rear admiral. At forty-five, Moreell was one of the youngest officers to hold that rank. He was selected over seven more senior commanders, seven captains, and one rear admiral {RADM Parsons, who already had been Chief, but was still on active duty with the permanent rank of rear admiral). On 1 June 1941 RADM Moreell was promoted to the permanent rank of captain; however, he never wore a captain's four stripes because he was still Chief and still a temporary rear admiral.

One of RADM Moreell's first accomplishments upon becoming chief was to survey the Navy's docking, repair, and base facilities in the Atlantic and Pacific Oceans. He found the condition of the Pacific facilities to be far less than the anticipated need and vigorously urged their expansion, particularly the bases in Hawaii, and at Midway and Wake islands. Aware that the ships that count are those that can stay in the battle line and that repair facilities must be located as close as possible to the probable scene of action, RADM Moreell urged the construction of two giant graving docks at Pearl Harbor and the transfer of an inactive floating dry dock from New Orleans. These dry docks were later to prove invaluable for repairing the battleships crippled during the attack on Pearl Harbor.

Among Ben Moreell's most important accomplishments was the execution of the world's largest integrated shore establishment construction program. This vast five year program represented an investment of more than $10 billion, or approximately fifteen times the value of the whole prewar shore establishment. Before the end of World War II, this vast network of facilities totaled more than 900 naval bases and stations, including 300 advance bases, some as large as medium size cities. Construction of these facilities kept pace with the rapid advance of U.S. forces and provided the support necessary to sustain the far-flung operations of the U.S. Fleet during the war. The construction of this support structure was illustrative of RADM Moreell's creed: "Hard work is the best road to success, and there is no substitute."

With that saying in mind no doubt, RADM Moreell set an example for his subordinates; he was nearly always the first man to arrive in the morning and among the last to leave at night, a practice which other officers felt obliged to emulate.Moreell had no patience for those who waited for work to come to them; he once told a friend “If you can't find enough work to keep busy, you can always write a book” (advice he, himself, followed on several occasions). He never accepted a task unless he felt that he could devote sufficient time to do it right. Those who met Moreell for the first time were always impressed by his dynamic personality; Moreell was direct, forceful, brief and to the point, but always friendly. His close associates addressed him as “Ben,” and his subordinates spoke of him when he was not present as “Big Ben.” While he wasted no time, one of his most endearing traits was his penchant for talking to people and listening to their problems.

As war appeared more likely and one of the most probable antagonists appeared to be the Japanese Empire, it became apparent that construction in forwards areas of the Pacific, isolated islands for the most part, might prove difficult for civilian contractors. Navy construction work was performed under contract by general contractors using civilian construction workers; in the event of war, however, such workers would be at risk in forward areas. As civilians they and the projects they built would be at the enemy's mercy. Even if trained and armed they could not defend themselves or their works without running the risk of being shot as guerrillas, if captured. Thus, such workers would have to be protected by separate military units which would constitute a drain on manpower needed elsewhere. What was needed was a militarized Navy construction force, akin to Army Corps of Engineer units, that could, if need be, defend what it built.

The concept of a naval construction force had, in fact, been added to the bureau's war plans sometime during the 1930s. CAPTs McKay and Allen, and RADM Smith, officers who had played a pivotal role in the development of such an ad hoc force during World War I, were responsible for this addition. Nevertheless, nothing concrete was done with the idea prior to 1941.

A new type of Navy unit did appear in late 1941, although it was not a construction unit.To facilitate the great worldwide construction program then underway, the Bureau of Yards and Docks proposed the establishment of the “Headquarters Construction Company,” composed of two officers and ninety-nine enlisted men. Under the direction of the officer in charge of construction of a given project, the men of the Headquarters Construction Company would serve as draftsmen, engineering aids, and inspectors. They were to perform administrative duties and oversee the work of the civilian contractors, but were not, themselves, to perform actual construction work. RADM Chester W. Nimitz, USN, then Chief of the Bureau of Navigation (the forerunner of today's Naval Military Personnel Command), authorized the first Headquarters Construction Company on 31 October 1941. By 1 December 1941 men had been recruited for the unit and were undergoing basic training at the Newport Naval Station in Rhode Island.

On the same date that the Headquarters Construction Company was authorized, RADM Ben Moreell was sworn in for his second term as Chief of Bureau of Yards and Docks and, six days later, the Japanese attacked Pearl Harbor and the United States was plunged into World War II. On 16 December the Navy authorized four additional headquarters companies; however, the Pearl Harbor attack had changed the entire situation and the Headquarters Construction Company program was abandoned. The fate of civilian construction workers on Wake Island and Guam demonstrated the folly of thrusting civilian employees into war zones. This led directly to the creation of the Naval Construction Force.

On 28 December 1941 RADM Moreell requested authority to raise Navy construction units. On 5 January 1942 the Bureau of Navigation granted him authority to recruit experienced construction workers and organize them into a construction regiment comprising three battalions. However, the construction unit included in the approved Navy war plans differed in one important aspect from the unit envisaged by Ben Moreell: command was to be the prerogative of a line officer. The war plans called for a line officer commanding officer who would be responsible for combat leadership, discipline and military justice. Under him would be a Civil Engineer Corps officer who would be in charge of actual construction. It must be remembered that at this time no staff officer had the power of command. RADM Moreell recognized that this bifurcated command structure would be unworkable in practice. He went directly to the Secretary of the Navy and requested that Civil Engineer Corps officers be placed in command of the new construction units. On 19 March 1942 Secretary Knox granted that authority; however, Civil Engineer Corps officers were to bear the title “officer in charge” rather than “commanding officer.” The gaining of command status for Civil Engineering Corps officers was one of Ben Moreell's most important accomplishments. It is doubtful that the new Naval Construction Force, which acquired the name “Seabees” on 5 March 1942, could have been welded into an effective force with the dual control system originally envisioned. For this reason alone, if for no other, Ben Moreell justly earned the title “Father of the Seabees.”

The first Headquarters Construction Company was augmented with general service recruits and recommissioned as the “First Construction Battalion, USN,” on 21 January 1942. The unit shipped out immediately to build critically needed facilities on Bora Bora. From this small beginning the Seabees would increase to more 250JOOO men and 12,000 officers and would take part in every amphibious operation undertaken by U.S. forces during the war, in many instances, landing with the first waves of assault troops.

During the course of the war, Ben Moreell traveled to forward areas and combat zones in both the Atlantic and Pacific theaters of operations in order to personally assess how his Seabees were performing. In 1944, prior to the Normandy invasion, he went on an inspection tour of Great Britain to survey preparations for the upcoming landings and in August 1945 he toured the Pacific, stopping at Okinawa to determine the progress of construction there.

On 1 February 1944 Ben Moreell was promoted to Vice Admiral. At the time, he was not only the first Civil Engineer Corps officer to hold that rank but also the youngest officer in the Navy's history to do so. Between 1949 and 1959, nine other Civil Engineer Corps officers would be promoted to vice admiral -- but only upon retirement from active duty or from the Naval Reserve.

In addition to managing the huge wartime shore base construction program, Ben Moreell also represented the Secretary of the Navy from November 1943 to October 1945 on a committee charged with expediting the lagging construction of critically-needed production facilities for 100-octane gasoline. Moreell carried out a thorough investigation of the delayed construction and determined the causes. He then worked tirelessly to see the program through to completion, first by evaluating the 100-octane gasoline project in relation to other primary war projects, then by loaning industrialists serving as naval officers to aid the subcontractors in expediting delivery of material and equipment to the plants, and finally by drawing upon armed forces personnel to provide labor when civilian workers could not be obtained. The successful completion of this program assured the constant availability of 100-octane gasoline, vitally needed for air operations in all theaters of the war.

In October 1945 VADM Moreell was designated Officer in Charge of Petroleum Facilities to administer refineries and pipelines to be seized in accordance with Executive Order No. 9639 after labor strikes had put them out of operation. Following unsuccessful negotiations between management and the unions in October, the industry suffered a complete work stoppage and plunged the nation into an oil crisis. VADM Moreell promptly carried out the unprecedented executive order and seized 49 oil refineries and 4 pipelines. He then organized the Naval Petroleum Plants Office and restored and maintained full production at all the seized facilities, inspiring confidence in both labor and management. He carried out this responsibility until April 1946.

On 1 December 1945 VADM Moreell completed his second tour as Chief of the Bureau of Yards and Docks. After eight years as chief, which included service during the greatest war in U.S. history, the "King Bee" was appointed Chief of the Material Division of the Office of the Secretary of the Navy. A few months later, in May 1946, he was appointed Deputy Coal Mines Administrator, in charge of the operation and administration of the bituminous coal mines seized by Executive Order No. 9728. The Secretary of the Interior subsequently appointed him the Coal Mines Administrator and, as such, VADM Moreell had complete charge of this activity. In May 1946 Moreell also became a member of a board of consulting engineers established to advise on improvements to the Panama Canal to meet the future needs of interoceanic commerce and national defense.

On 11 June 1946 VADM Ben Moreell was promoted to the rank of Admiral, thus, becoming the first non-Naval Academy graduate as well as the first, and to date, only Navy staff Corps officer to hold four-star rank. A few months later, on 30 September 1946, ADM Moreell was relieved of all active duty and retired from the Navy. Thus, an almost incredible Navy career drew to a close. From a humble beginning, ADM Moreell rose to four-star rank in the Navy and oversaw construction and maintenance of all Navy facilities during World War II. He personally intervened to establish a militarized Navy construction force, the Seabees, and secured the right of command for his fellow Civil Engineer Corps officers so that they could direct the activities of the new force. In addition to his great responsibility as Chief of the Bureau of Yards and Docks, he also took on additional responsibilities, such as managing strike-bound oil refineries and coal mines. His drive, energy, and accomplishments clearly make ADM Ben Moreell the single most important Civil Engineer Corps officer in the history of corps. However, even though his naval career was ended, his accomplishments would continue in his subsequent civilian career.

One day after he retired, Ben Moreell was elected President of the Turner Construction Company of New York. After a few months at Turner, Moreell became Chairman of the Board and President of the Jones & Laughlin Steel Corporation of Pittsburgh, Pennsylvania. Under his leadership Jones & Laughlin initiated a $500 million expansion program which added impetus to Pittsburgh's redevelopment. When Jones & Laughlin decided to build a new $70 million open hearth shop in a blighted area of Pittsburgh's South Side, Ben Moreell, working with the union and city government, found homes for the 296 families that had to relocate from the area.

In 1951 the Junior Chamber of Commerce chose Ben Moreell as the “Pittsburgh Man of the Year.” He also received the Brotherhood Award of the National Conference of Christians and Jews that year. In 1956 he received the Page One Award of the Pittsburgh Newspaper Guild. Writing in The Freeman Magazine, Rev. Edmund A. Opitz said of him:

He is a naval engineer who is now one of the nation's top-flight industrialists. Among industrialists, he is one of the most vigorous and articulate spokesman for free capitalistic enterprise. In addition, Ben Moreell is a prime mover in the well-known “Pittsburgh

Experiment" which brings religion into the market places and social clubs of that city. It is evident that the Admiral's concern for individual freedom and limited government is inseparable from his religious beliefs.

ADM Moreell gave up the presidency of Jones & Laughlin in 1952, but remained Chairman of the Board until 1957 and stayed on the Board of Directors until his retirement in 1964. For some years after that, he worked as a private business consultant.

In 1953 ADM Moreell accepted an appointment from former President Herbert Hoover to serve as chairman of the task force on water resources and power for the Second Hoover Commission. He was also a member of the board of consulting engineers for the Panama Canal.

After his retirement from the Navy, ADM Moreell became intensely interested in political philosophy and religion. He wrote numerous works and spoke before diverse audiences on these subjects. A staunch conservative, Ben Moreell, in 1958, joined with the Honorable Charles Edison, former Secretary of the Navy and former Governor of New Jersey and then Chairman of the Board of McGraw-Edison Company, and Mr. Henning Prentis, Chairman of the Board of the Armstrong Cork Company, to found Americans for Constitutional Action (ACA). ACA was conceived as a nonpartisan, nonprofit, nationwide, political action organization whose goal was to help elect to Congress men and women who were dedicated to the restoration and preservation of the spirit and principles of the U.S. Constitution, as expounded by the founding fathers. Ben Moreell remained chairman of ACA until 1973.The titles of some of his addresses and publications are indicative of his philosophy: "Government and Moral Law," "In Search of Freedom," "Moral Responsibility and Liberty," "To Communism via Majority Vote," "Religion in American Life: A Layman's Appraisal," "The Role of American Business in Social Progress," and "What Price Socialism," to name but a few.

In 1975 the Construction Division of the American Society of Civil Engineers selected ADM Moreell as one of the ten men who contributed most to the advancement of construction methods during the past half century. In 1977 the same organization gave Ben Moreell its President's Award for "distinguished service to his country in times of war and peace."

ADM Ben Moreell's long, accomplishment filled life came to an end in Montefiore Hospital in Pittsburgh, Pennsylvania, on 30 July 1978. He was buried at Arlington Cemetery.

Physically, Ben Moreell was a man of formidable presence; he towered well over six feet, was powerfully built, and square of jaw. He remained vigorous throughout his life; and, in fact, when seventy physically helped to subdue a burglar who had invaded his house.

In addition to the Haitian medals already mentioned, ADM Moreell was awarded the Distinguished Service Medal for "...exceptionally meritorious service to the Government of the United States in a duty of great responsibility as Chief of the Bureau of Yards and Docks and Chief of Civil Engineers, U. S. Navy, from December 7, 1941, to August 31, 1945." The citation concludes by saying that ADM Moreell displayed "...great originality and exceptional capacity for bold innovations," and that he '"...inspired in his subordinates a degree of loyalty and devotion to duty outstanding in the Naval service to the end that the Fleet received support in degree and kind unprecedented in the history of Naval warfare." For his efforts from 1943 to 1945 in connection with the provision of 100-octane fuel production facilities, ADM Moreell was awarded the Legion of Merit; and for his efforts in 1945 and 1946 to resolve the crisis in oil production he was awarded a Gold Star in lieu of a second Distinguished Service Medal. Finally,

Great Britain awarded ADM Moreell the Order of the British Empire, Military Branch, Rank of Commander, in recognition of his outstanding contribution to the allied war effort.

ADM Moreell has also been honored in many other ways. In 1955 the Society of American Military Engineers created and awarded a new medal, the Moreell Medal. This medal is given annually to active, former, reserve, and retired Civil Engineer Corps officers and to civilian employees of the Naval Facilities Engineering Command in recognition for outstanding contributions to military engineering through achievement in design, construction, administration, research and development. In 1968 a new wing of the CEC-Seabee Museum at the Naval Construction Battalion Center, Port Hueneme, California, was named the “Ben Moreell Wing.” A portion of the new wing was dedicated to ADM Moreell's personal memorabilia and the remainder to other important Civil Engineer Corps officers. In similar fashion, the library of the Naval School, Civil Engineer Corps Officers, Port Hueneme, California, was named the "Moreell Library" in ADM Moreell's honor and his private papers were placed in a vault there. Finally, in 1980 a “Ben Moreell Memorial” was dedicated at the Naval Academy. The memorial consisted of a bust sculpted by Felix de Weldon, creator of the famous Marine Corps Memorial.

Nevertheless, the most fitting memorials to ADM Ben Moreell and perhaps those which most pleased him were the titles “Father of the Seabees” and “King Bee.”

THE CIVIL ENGINEER CORPS AND THE FIRST SEABEES:
THE MYSTERY OF THE TWO “FIRST BATTALIONS”

A question frequently heard is “Who were the first Seabees?” The answer is complicated by the fact that for a time during the early days of World War II there were two units which bore the designation “First Construction Battalion.”

As we learned in the previous vignette, the use of civilian construction workers was impractical in forward areas. Such workers could not defend what they built and if they attempted to do so could be executed as guerrillas under the terms of the Geneva Convention. In accordance with war plans formulated during the 1930s, RADM Ben Moreell, Chief of the Bureau of Yards and Docks, requested authority to raise Navy construction units on 28 December 1941. On 5 January 1942 the Bureau of Navigation granted him authority to recruit experienced construction workers and organize them into a construction regiment comprising three battalions. Events, however, outran planning. The Navy immediately needed a fueling station built on Bora Bora in the French Society Islands to support ships and planes that were keeping open the sea lanes to Australia. There was no time to complete the organization and training of the newly authorized construction regiment; construction men were needed at once on Bora Bora!

To meet the demands of this critical situation, the Bureau of Yards and Docks proposed to organize a single construction battalion to be known as "Construction Battalion BOBCAT" after Bora Bora's code name. The battalion was to be formed around the First Headquarters Construction Company which had been trained and equipped for an assignment on Iceland but was still at Newport, Rhode Island. As mentioned earlier, this unit had originally been authorized on 31 October 1941 to perform administrative duties and oversee the work of civilian contractors and was composed of draftsmen, engineering aids, and inspectors. To the 100 men of the First Headquarters Construction Company, many of whom were experienced construction men, was added a draft of 150 general service recruits from the Newport Basic Training Camp who had no construction experience. The new unit was to consist initially of eight officers and 250 enlisted men. Additional personnel drafts were subsequently to increase its size.

The Bureau of Yards and Docks approved the draft organization of Construction Battalion BOBCAT on 9 January 1942; and on 10 January, the bureau requested that the Bureau of Navigation also approve the new unit and issue orders for its establishment. The Bureau of Navigation did so and the personnel of the new battalion assembled at the Naval Air Station, Quonset Point, Rhode Island, for a brief familiarization course in construction equipment operation and Quonset hut erection. Following this training, the men were sent to Charleston, South Carolina, where the battalion was to be officially formed and then depart for Bora Bora.

On 14 January 1942 the Bureau of Navigation ordered LCDR Harold M. Sylvester, CEC, USN, to report to the Commandant, Sixth Naval District at Charleston “...for duty in the connection with the organization of the First Construction Battalion and as officer in charge of that battalion when organized.” On 21 January 1942 LCDR Sylvester informed the Bureau of Navigation that “The organization of the Battalion was completed and the Battalion was placed in service by the Commandant, Sixth Naval District [RADM William H. Alan, USN] at 11:00 a.m. this date.” Thus, the first Seabee battalion came into existence.

Although called a “battalion,” the new unit was only a reinforced company in terms of actual strength. Despite this, it was commanded by a lieutenant commander and was officially designated the "First Construction Battalion, USN." Only six days after its establishment, on 27 January, the battalion shipped out for Bora Bora.

While the unit might be the first construction battalion, its personnel did not call themselves Seabees. The term “Seabee" was not coined until a month after the battalion's departure and it was not approved by the Bureau of Navigation until 5 March 1942. Lacking a name, the construction men of the new unit called themselves “Bobcats” after their destination's code name. They did not know that they were Seabees until a 120-man draft for the unit arrived on Bora Bora in June 1942. The new men called themselves Seabees and the old Bobcats learned to respect the new name when they subsequently heard of Seabee exploits on Guadalcanal.

While the Bobcats might now be Seabees, their unit was no longer the First Construction Battalion. On 26 March 1942, the Bureau of Yards and Docks had requested of the Bureau of Navigation “... that the referenced orders [of 14 January 1942] issued to Lieutenant Commander H. M. Sylvester, CEC, USN, be so far modified as to designate him as Officer in Charge of the First Construction Detachment, in lieu of the First Construction Battalion.” To understand this change in designation, we must go back once again to January 1942. During that month planning was underway not only for a construction unit on Bora Bora, but also for two additional units which would be sent to Tongatabu (code name BLEACHER) in the Tonga Islands and Efate (code name ROSES) in the New Hebrides Islands. On 15 January 1942, a week before the First Construction Battalion was established at Charleston, a Bureau of Yards and Docks memorandum recommended 16 CEC officers "...for duty with Construction Battalion Detachments for Bleacher and Roses."

As it turned out, the two proposed detachments were not formed separately, but as a single battalion on 15 March 1942 at Camp Allen (named after CAPT Allen of 12th Regiment fame), Norfolk, Virginia. The new battalion was designated the First Construction Battalion! However, unlike the "battalion" formed at Charleston on 21 January, this first battalion had a normal table of organization: one Headquarters Company and four construction companies with a total complement of 1,080 men. On 1 April 1942 the new battalion was officially divided into two detachments (as originally anticipated in the planning). One half of the headquarters company and “A” and “B” companies became the Second Construction Detachment, commanded by LCDR Forrest E. Byrns, CEC, USNR. The remainder of the Headquarters Company and companies “C” and “D” became the Third Construction Detachment, commanded by LT (later RADM) Harry N. Wallin, CEC, USN.

There now existed three construction detachments: the first was building fueling facilities on Bora Bora, while the second and third completed their training at Camp Allen. On 8 April 1942 the Second Construction Detachment departed for Tongatabu to build a fueling station and air base. Four days later, on 12 April, the Third Construction Detachment departed for Efate to build a forward air base.

The Bobcats of the First Construction Detachment had absolutely no connection with the men of the Second and Third Construction Detachments. The Bobcats remained on Bora Bora until September 1943 by which time the war had moved west and the island had become a backwater. On 11 September 1943 the First Construction Detachment departed Bora Bora for Noumea, New Caledonia (leaving behind 2 officers and 31 men to train Construction Battalion Maintenance Unit 519 in base maintenance).

En route to their new destination, the Bobcats were diverted to the Samoan Islands and they landed at Pago Pago on 6 September 1943. The First Construction Detachment was now redesignated the "Naval Construction Company" and assigned to the 22nd Marine Regiment, Reinforced. During the next seven months, the Bobcats not only performed general construction

work, but also saw action in assault engineer and demolition squads during the campaign in the Marshall Islands. After twenty-six months of tropical campaigning, on 17 April 1944, the Bobcats were once again designated the "First Construction Detachment" and were shortly after detached from the Marines. On 5 May 1944 the detachment was attached to Naval Construction Battalion Three for return to the U.S. with that unit. On 7 June 1944 the First Construction Detachment was inactivated at the Construction Battalion Replacement Depot, Camp Parks, California.

The Second Construction Detachment remained on Tongatabu until February 1943 where it completed numerous projects. Among these was the installation of a concrete bulkhead in the damaged aircraft carrier USS SARATOGA. On 25 February 1943 the Second Construction Detachment left Tongatabu for Efate where it was to join the Third Construction Detachment (a 160-man detachment was left behind, and did not arrive on Efate until 8 December).

The Third Construction Detachment completed many significant projects while in the New Hebrides Islands. The most important involved forward air base construction. Not only did the detachment build an airfield and facilities on Efate, but part of the detachment also built an extremely important airfield on Espiritu Santo (code name BUTTONS). This 6,000-foot coral-surfaced field, built in only 20 days, allowed U.S. aircraft to begin bombing the Japanese airfield on Guadalcanal before it could be completed and planes from it sent into action against U.S. forces.

On 1 March 1943 the Second Construction Detachment arrived at Efate. Six weeks later, on 14 April, the Second and Third Detachments were inactivated and the First Construction Battalion was reformed. LCDR Byrns, the officer in charge of the former Second Detachment, assumed command of the battalion. The men left behind on Tongatabu by the Second Detachment now became the "EDIT" detachment of the First Construction Battalion. The First Battalion continued to operate on Efate until mid-February 1944 when, after almost two years in the tropics, it returned to the U.S. The battalion arrived at San Francisco

on 7 March 1944 and was shipped to Camp Parks the same day. On 13 June 1944 the First Construction Battalion was disestablished and its personnel assigned to other battalions.

Thus ends the strange tale of the two “first battalions.” The Bobcats were the first officially established "construction battalion," despite the fact that the unit's original strength was only 8 officers and 250 men. The unit was established as the First Construction Battalion because the Bureau of Yards and Docks planned to augment it with additional personnel and bring it up to battalion strength. The plan, however, was quickly abandoned as the situation in the Pacific evolved.

Less than two months after the Bobcats sailed for Bora Bora, the Navy established another First Construction Battalion. This full-strength battalion has the distinction of being the “first battalion” in reality as well as in name. One final point should be emphasized again: the First Construction Detachment (the Bobcats) had absolutely no connection -- either organizationally or as regards service -- with the Second and Third Detachments. While the latter were originally part of the same battalion and while they were reformed as such early in 1943, the First Detachment had an entirely separate existence.

CAPT WILFRED L. PAINTER, CEC, USNR:
A CIVIL ENGINEER CORPS ADVENTURER IN WORLD WAR II

CAPT Wilfred L. Painter was perhaps one of the most dramatic and flamboyant individuals to ever hold a commission in the CEC.

Wilfred Painter was born on 26 May 1908 in Dryad, Washington, the son of Lewis W. Painter and Clemmar B. Choate Painter. After completing primary and secondary education, he attended the University of Washington and received a degree in civil engineering in 1926. During the summers, while attending the university, and later during 1926 and 1927, Painter worked in lumber camps and gained experience in locating and building logging railroads, and in pile driving and rigging. Painter enlisted in the Marine Corps Reserve in July 1928 and was assigned to flight training. He was, however, relieved from active duty on 24 September 1928 after failing primary flight training.

In 1929 the Texas Company (China), Ltd., of Shanghai hired Painter as designing engineer for a group of new oil installations and supporting facilities in Shanghai, Hong Kong, Dairen, Tientsin and Hangkow, China. Approximately $10 million was spent on building these facilities, which included wharves, oil tanks, factory facilities, and power plants. Painter was the chief draftsman and designer in charge of all plans and specifications for these facilities. The majority of the installations were located in the countryside at considerable distances from existing utilities. This necessitated the construction of water filtration and purification plants or the digging of deep wells to supply potable water. This type of construction experience would prove useful to Painter during World War II when construction in inhospitable locations was the norm.

In 1933 Painter resigned from the Texas Company and formed his own firm, W. L. Painter Company, Engineers and Contractors, headquartered in Shanghai. During the following two and a half years, Painter designed a number of installations for Chinese interests using Soviet products, which were similar to those built for the Texas Company. These facilities included fifteen steel tank lighters. He also designed and was awarded the construction contract for the largest graving dock hitherto built in China.

The dock was built for the Chinese government at the Kian-nan docks in Shanghai at a cost of more than $1 million. It was designed to accommodate American Mail Line boats running into Shanghai and was 80 feet wide, 640 feet long and 30 feet deep. The dock was a unique construction which utilized a permanent double wall of steel sheet piling and was equipped with two 36-inch diameter propeller pumps. The dock was built under very adverse conditions, as the ground in this vicinity had been formed by mud brought down the Whangpoo River.

In addition to the dock, Painter designed and constructed a 10,000-gallon per day alcohol distillery which utilized molasses imported from Java. Painter's company also designed a large paper board mill in Shanghai. Finally, he designed and supervised construction of hangars and seaplane ramps for the China National Aviation Company (a Pan American subsidiary) at Lungwha, China; and designed numerous other facilities and buildings in the Far East. It was as a result of these projects that Painter established himself as the foremost American construction engineer in China at the time.

In 1935 Painter entered a partnership with John Graham, one of the best known architects in the U.S., and formed the company of Graham and Painter, Architects and Engineers, with offices in New York, Seattle, and Shanghai. Because of the Sino-Japanese War, the Chinese political situation was such that the firm was finally compelled to close its Shanghai office. Painter had

arrived in China in August 1929 and remained there until October 1937. In addition to his professional commitments, Painter served with the Shanghai Volunteer Corps (SVC} from 1930 to 1937 and was a member of the American Cavalry Troop of the SVC, first as a private then as a Lieutenant in 1937. While a member of the SVC, Painter participated in the defense of the International Settlement in 1932 and again in 1937.

Painter made the firm's Seattle office his new headquarters. In 1938 Painter's firm undertook design and construction of one of the largest rental projects built under the Federal Housing Administration. Located in Seattle, the project involved construction of more than 1,000 rooms. While working at the Seattle office, Painter attended the University of Washington on a part-time basis to study soil mechanics and concrete structures. Painter was a member of the American Society of Civil Engineers and was President of the Seattle Chapter of the State of Washington Licensed Engineers.

On 30 July 1938 Painter was commissioned a second lieutenant in the Marine Corps Reserve. He served with the 2nd Marine Division Fleet Marine Forces, Marine Corps Base, San Diego, California, from June 1940 until February 1941. On 3 February 1941 Painter resigned his Marine Corps commission and accepted a commission in the CEC Reserve with the rank of lieutenant. LT Painter, CEC, USNR, reported to the Naval Base, Long Beach, California. He served in California until 16 December when he reported to the Commander, Service Force, U.S. Pacific Fleet, at Pearl Harbor, to assist in salvaging naval vessels sunk during the Japanese attack.

LT Painter was made officer in charge of raising the battleships USS CALIFORNIA and USS WEST VIRGINIA. It took him only 45 days to raise the first ship which was placed in dry dock in April 1942; and an additional 30 days to raise the second ship which entered dry dock in May. Homer Wallin in Pearl Harbor: Why, How, Fleet Salvage and Final Appraisal says that “In the Salvage Division, by far the hardest worker and the one who set the pace for all others was Lieutenant Wilfred L. Painter....Lieutenant Painter was everywhere and spread enthusiasm and initiative.” For his efforts, LT Painter received a Letter of Commendation, with authorization to wear the Commendation Ribbon, from the Commander in Chief, U.S. Pacific Fleet. LT Painter is reputed to have hardly left the work-site during the whole 75 day period, working day and night to get the job done. When there were delays, he personally took over and by his own example and his somewhat forceful way of expressing himself overcame the problem.

Shortly after raising the USS WEST VIRGINIA, LT Painter was transferred on temporary duty to the Commander, South Pacific, first under VADM (later ADM} Robert L. Ghormley, USN, and then under VADM (later FADM} William F. Halsey, USN. Painter remained in that assignment from July 1942, when he was promoted to lieutenant commander, to January 1943. At that time, a proposal was made to establish a branch office of the Pacific Division of the Bureau of Yards and Docks in Noumea, New Caledonia, with Painter in charge.

The Commander in Chief, Pacific, however, disapproved the proposal and Painter was sent to the Commander, Air, South Pacific, for duty with the Commander, Naval Bases, South Pacific. From this time until May 1944, Painter had overall responsibility for airfield reconnaissance and airfield construction in the South Pacific Area. He personally carried out many reconnaissances on enemy-held islands, especially for siting airfields during the Munda drive. He practically sited and laid out all the airfields in the South Pacific Area, including those on Guadalcanal, Russell Island, New Georgia, Vela Lavella, Bougainville, the Green Islands, and Emiru. The Seabees subsequently built between 60 and 100 airfields at locations scouted by Painter.

The reconnaissance followed a prescribed routine. Acting on secret, verbal orders, LCDR Painter and a few companions would land in a rubber boat from a submarine on an enemy-held island. After identifying suitable landing sites, they would make their way inland marking out airfield locations and identifying water supplies and other useful features. Sometimes they met coast watchers -- planters who hid in the jungle among the natives and provided valuable intelligence via shortwave radio on Japanese troop dispositions. The Japanese never discovered any of Painter's survey parties, even on islands where they had long been in occupation and had the natives thoroughly cowed.

Painter, who was promoted to commander in February 1943, particularly distinguished himself during Operation TOENAILS, the capture of New Georgia, Munda, and Rendova. Part of the invasion plan called for a "quickie" airfield to be built during the initial phase of the attack on New Georgia so that air support could later be maximized against Munda. Following a preliminary reconnaissance, Painter identified a coconut plantation near Segi Point as the ideal site for the airfield. When the necessity for speed was emphasized, after he had submitted his report to the Commander, Air, South Pacific, Painter said that, “A survey party could sneak in ten days early and mark the grades. Then the bulldozers could fling dirt as soon as they came off the boats.” Painter estimated 30 days to build the airfield, although he maintained that "any damn fool could do it in fifteen. If he's good, like me, he should have the field operating ten days after the bulldozers go ashore. His boss immediately assigned the job to Painter and gave him fifteen days to build the field, but added that he had better have it operational in ten if he did not want to be considered any damn fool."

On 21 June 1943 two companies of the 4th Marine Raider Battalion landed at Segi and drove the enemy back from the plantation. Painter and his survey party went ashore with the 103rd Infantry the following day and during the next ten days laid out the whole air station. On 30 June 17 officers and 477 men of the 47th Seabee Battalion arrived and construction began on the airfield. The men worked 24 hours a day, despite nightly air attacks, and much to Painter's relief got the airfield operational within 10 days. Supported by fighters from the new air field, U.S. forces took Munda on 5 August and on 15 August Seabees went ashore on Vella Lavella and began building a new airfield on another site selected by Painter. For his actions during this period, Painter was awarded the Legion of Merit with Combat “V” and a Gold Star in lieu of a second Legion of Merit with Combat v."

Perhaps Painter's most daring enterprise was the “Painter Expedition” to China which took place from July to October 1944. In early 1944 the allies were planning a landing on the Chinese coast as a springboard for a later attack on the Japanese homeland. For this landing to succeed, detailed intelligence about the occupied coastal region was needed. Painter was selected to lead the survey party because of his reconnaissance exploits in the South Pacific and his knowledge of China, gained during his eight year residence there. In May Painter was ordered to the Bureau of Yards and Docks in Washington, DC, to prepare for the mission. He was also promoted to captain at this time which, at 35, made him the youngest captain in the Navy. After sifting through available intelligence information in Washington, he arrived in China in June, gathered men and equipment from the local U.S. commander, and with a fellow Civil Engineer Corps officer, CAPT Charles M. Noble, set off in a C-47 for the survey area. This was a mountainous region (elevations to 6,000 feet) approximately 200 miles wide by 500 miles long extending from the Ningpo Peninsula to Arney Island. The survey party was to make an engineering appraisal of potential landing sites, harbors, inland waterways, roads, railway facilities, and airfield sites; determine the availability of building materials; and formulate a cost estimate for equipment, manpower, and materials needed to support a major military operation in the region. The party was also to gather information on existing food supplies, climatic conditions,

indigenous diseases, the disposition and effectiveness of enemy forces, and the availability and effectiveness of local labor. Finally, Generalissimo Chiang Kai-Shek requested that the party also locate and evaluate the Nationalist Chinese military forces in the area.

CAPT Painter divided the survey party into subgroups and assigned a portion of the survey area to each. One of the first accomplishments of the survey party was the erection of an automatic radio recording weather station to provide the U.S. Fleet with information on eastward moving weather systems. After the survey got underway, radio communications between the subgroups failed and communications could only be sporadically maintained by runners. To complicate matters, the Japanese initiated a major offensive to eliminate Chinese resistance by gaining control of the Hankow-Canton Railway, reinforcing the coastal areas, and capturing the airfields from which the U.S. Army Air Force was attacking Japanese military forces in the China Sea. By August the Japanese had gained control of the railway and turned west to attack the airfields.

CAPT Painter and his subgroup barely escaped the Japanese on the Ningpo Peninsula by marching 60 miles in 21 hours and slipping through Wenchow while Japanese marines were landing on the waterfront and Japanese soldiers were entering the western suburbs. Following the narrow escape from Wenchow, Painter sent the rest of his group to Chien-yang, with the information thus far gathered, while he headed south via foot and sampan with one Chinese companion to the region of Amoy Island where the Japanese had a major base. CAPT Painter again joined the survey party on 11 October 1944 and all personnel were shortly thereafter flown out of the area. In Chungking, a report consisting of documentation and photographs was prepared which weighed 480 pounds. Thus, the daring Painter Expedition reached a successful conclusion. The expedition earned Painter a third Gold Star for his Legion of Merit with Combat "V."

In October 1944, CAPT Painter returned to Washington with the Painter Expedition report and was subsequently reassigned to the Commander in Chief, Pacific Ocean Area, at Pearl Harbor, as Special Reconnaissance Officer with the Commander, Service Force, Pacific. He assisted in making plans for the Okinawa and Leyte operations and was sent to Leyte to study developments there and at Samar. He subsequently returned to Washington, DC, with a report and recommendations for Navy installations on Leyte and Samar and was awarded a fourth Gold Star for the Legion of Merit with Combat "V."

In the spring of 1945 CAPT Painter headed the Painter Board which set construction limits for Army, Navy, and Marine Corps installations in the Marianas. He then left for China in July to serve as staff advisor to the Commanding General, U.S. Forces, China. He served in this position until October and was awarded the Army Bronze Star Medal as well as another Legion of Merit for his services there. On 5 November CAPT Painter was ordered to the Naval Personnel Separation Center in Washington, DC. The war was over and his Naval service was coming to an end. After four months leave, he was detached from active duty, effective 8 March 1945. Thus, ended the colorful military career of CAPT Wilfred L. Painter.

Painter's adventures, however, did not end with his Navy career. He went to work for the Pacific Bridge Company in San Francisco, returning briefly to Shanghai for that company. He next joined the firm of Starr-Parke & Freeman in New York City as head of the Construction Department. He subsequently was employed by the firm of Guy F. Atkinson in San Francisco. In early 1946, in Shanghai, Painter married Galla Feiderinchika, the daughter of a Russian emigre, Baron Feine Feiderinchik. CAPT and Mrs. Painter subsequently had two sons, William and Douglas.

After joining the Atkinson firm, Painter went to Athens, Greece, as project manager for a $64 million USA Engineer War Department construction contract, undertaken jointly by Atkinson and Johnson-Drake & Piper of Minneapolis for the reconstruction of highways and railroads in Greece.

In April 1948, VADM William L. Calhoun, USN, one of CAPT Painter's former bosses, recommended that he be promoted to commodore in the Naval Reserve, stating that in 1945 Painter had been selected to command a Naval Construction Brigade with a promotion to commodore; however, at the personal request of the Commander in Chief, Pacific, CAPT Painter had been retained on his staff. No action was taken on the recommendation and Painter's life was have its last dramatic act approximately a year later.

While on a visit to Washington, DC, on Sunday, 10 July 1949, CAPT Painter was among the guests at a luncheon party which was to be held aboard the yacht, Halcyon. However, during refueling at the yacht club, there was an explosion aboard the vessel which killed CAPT Painter and another guest, Major General Vernon E. Prichard, USA. Thus, while emerging without a scratch from numerous harrowing escapades during the war, Wilfred Painter was killed in an accident prior to a luncheon on the Potomac.

CAPT JOHN N. LAYCOCK, CEC, USN,
AND THE "MAGIC BOXES" THAT HELPED WIN WORLD WAR II

CAPT John Laycock was not a flamboyant officer like CAPT Painter; nevertheless, he made a contribution to the war effort that was of the greatest significance.

John N. Laycock was born in Methuen, Massachusetts on 18 May 1892; he attended primary and secondary school in that city and was subsequently appointed to the Naval Academy in 1910. He graduated in 1914 and then served aboard the battleship USS VIRGINIA. His ship was at Vera Cruz, Mexico, during the occupation of July-December 1914. Following his tour with the VIRGINIA, ENS Laycock began postgraduate work at Rensselaer Polytechnic Institute and received a bachelor of engineering degree in 1917. On 6 June 1917 he was promoted to lieutenant, junior grade, and transferred to the Civil Engineer Corps.

During the 1920s Laycock's career was much like that of his fellows; between 1917 and 1927 he performed public works functions at the Naval Air Station, Cape May, New Jersey; the Navy Yard, Charleston, South Carolina; the Fifteenth Naval District (Canal Zone); and the Naval Station, Newport, Rhode Island. In 1927, the President nominated Laycock, now a lieutenant commander, as Treaty Engineer of the Republic of Haiti and the President of Haiti appointed him as such. In this position, LCDR Laycock served as Director of Municipal Engineering from 1927 to 1928, and as Executive Officer of the Public Works Administration of the Republic of Haiti from 1928 to 1931. Laycock was the last such Treaty Engineer and was made a Commander of the Order of Honor and Merit by the Haitian government for his services.

From 1934 to 1937 Laycock served at the Boston Navy Yard and later became its Public Works Officer as well as that of the First Naval District. In 1934 he was promoted to Commander and in 1937 became Public Works Officer of the Portsmouth Navy Yard in New Hampshire. While in New Hampshire CDR Laycock was beset by health problems to such an extent that RADM Moreell decided to transfer him to Bureau of Yards and Docks headquarters in Washington, DC. Laycock was to become War Plans Officers, a position considered less strenuous, albeit one with less responsibility, than that of Public Works Officer at Portsmouth. It was in his new position that Laycock made his great contribution to Allied victory during World War II.

CDR Laycock reported to the Bureau of Yards and Docks in March 1939 after a period of recuperation from his health problems. As War Plans Officer, Laycock inherited a file full of material relating to the development of advance base facilities and amphibious equipment composed of pontoon sections. Laycock gave special attention to the material on pontoons which dated back to 1933 and addressed the problems inherent in transporting them in amphibious operations. The concept of a uniform pontoon which could be configured in various assemblies was originally developed as early as 1933 and 1934 by the then War Plans Officer, CAPT Carl A. Carlson, CEC, USN, and his staff. This material was later supplemented by proposals received in 1935 and 1936 from a LCDR Paul W. Hains, CC, USN, an officer in the Bureau of Construction and Repair, which called for bolting steel pontoons together with fasteners through the pontoon walls. Hains's concept was based on a sectional steel barge which was under construction at the time for the Navy.

Laycock discarded the fastenings proposed by Hains, deciding that they were too slow and unsafe and did not provide necessary unit strength to the pontoons so joined. He wanted to develop a fastening system that provided strength, durability, and ease of assembly using simple tools. Laycock used cigar boxes to create model pontoon assemblies. He discovered that if he assembled the cigar boxes with kite sticks across the joints he could produce a rigid structure

without putting excessive strain on the individual fastenings. Assisted by a civilian employee, he next developed a system of fastenings and long steel bars to be used on full-sized pontoons.

Having developed an effective fastening system, Laycock turned to the pontoons themselves. Calculating for maximum efficiency, he developed a standard five by five by seven foot steel pontoon and various pontoon assemblies that could be made from it. The pontoon so developed would become own as the NL or "Naval Landing" pontoon. On 18 February 1941 contracts were awarded to the Pittsburgh-Des Moines Steel Corporation for construction of three experimental assemblies: a 50-foot barge, a 100-ton dry dock, and a seaplane ramp. Following successful tests of the completed assemblies, the Navy ordered 3,000 pontoon units. As pontoon development became a major effort, a Pontoon Experimental Area, was established at Quonset Point, Rhode Island, where assemblies could be tested under something approaching field conditions. The training of pontoon crews also commenced at Allens Harbor, adjacent to the Advanced Base Depot, Davisville, Rhode Island. This training took place under the direction of LCDR Harold T. Sylvester, CEC, USN, who would later command the "Bobcats," the first Seabee unit to actually deploy.

Laycock was promoted to Captain in January 1942 and, following the British getting wind of U.S. pontoon development, found himself in conference with Prime Minister Winston Churchill. Churchill was interested in the feasibility of building pontoon landing fields for use in the Indian Ocean. In fact, such a floating airfield was constructed as an experiment in Narragansett Bay; it was 1,800 feet long and 175 feet wide. During testing, planes were successfully landed on, and flown off it. Nevertheless, it was decided that air operations off it were not feasible in waters more turbulent than those of Narragansett Bay. The experimental floating airfield was subsequently dismantled.

Meanwhile, pontoon assemblies of a more mundane nature were deployed to the operating forces. Certain Seabee units, notably Naval Construction Battalion 70 and its daughter detachments, became pontoon specialists who directly participated in amphibious landings. In addition, special Seabee Pontoon Assembly Detachments were formed to assemble and operate the different types of pontoon assemblies. After taking North Africa, the Allies moved on to Sicily, the assault of which presented special problems. Because of the shallowness of the waters off the selected landing sites, LSTs could approach no closer than 300 feet, yet existing pontoon causeway assemblies could only bridge a 175-foot gap. Working with Royal Navy Captain T. A. Hussey, CAPT Laycock hit upon the solution of using two such causeways slightly overlapped at the joining point, thus producing a causeway 350 feet in length -- enough to reach from the LSTs to the beach and make the landing in Sicily possible.

Following the Italian campaign landings, planning began for landings on the coast of Normandy. Because of tidal forces, it was inadvisable to beach the LSTs at the closest point of approach as was done in Sicily. It was necessary to develop a way to unload LSTs while they were still afloat. To meet this need, Laycock and his team developed the “rhino” ferry, a self-propelled pontoon barge which transported cargo from a moored LST to shore. CAPT Laycock and his fellow researchers also conceived the idea of using sunken ships as a breakwater to create an artificial harbor at Omaha Beach. In addition, they developed floating wharves attached to causeways running to shore at which ships could be unloaded, sunken causeways, and warping tugs made out of pontoon assemblies. The creative use of pontoon assemblies and artificial breakwaters made possible the Normandy invasion.

The same techniques were also employed in amphibious operations in the Pacific Theater. Without the innovations in pontoon technology developed by CAPT Laycock and his team, many of the most ambitious amphibious operations of the war would have simply been impossible.

In addition to pontoon assembly development, CAPT Laycock participated in the development of other advance base equipment such as Quonset huts, portable refrigerators powered by both electricity or gas, portable pumping systems, trailer-carried fire pumps, self-contained power plants, oil fog generators for producing protective smoke screens, and collective protectors to remove lethal gases from air furnished to bomb shelters.

Unfortunately, CAPT Laycock's health problems recurred during the war and forced his retirement from active duty on 1 March 1945. He was, however, still employed as an advisor and, in that capacity, even traveled to the Pontoon Proving Grounds at Davisville to oversee testing.

For his contribution to the war effort, CAPT Laycock was awarded the Legion of Merit and a Gold Star in lieu of a second Legion of Merit. Although CAPT Laycock spent the war in a desk job that he was given for health reason, he managed to assure himself a place in military history. Starting with an old file folder of pontoon assembly concepts, CAPT Laycock oversaw and directly participated in the development of whole systems of pontoon assemblies that were crucial for the success of the amphibious warfare that was so much a part of World War II. Without Laycock's managerial and inventive genius the course of the war may well have been different and certainly the number of casualties sustained by the Allies during amphibious operations would have been much higher, perhaps so high that many of the most critical of these operations would not have been undertaken at all. CAPT Laycock's accomplishment in taking an idea and making it into reality cannot be underrated.

CAPT John N. Laycock died in 1969, having lived long enough to see the pontoon assembly concepts that he perfected during the war employed throughout the world in numerous civilian applications.

LT ROBERT L. RYAN, CEC, USNR, CORDIALLY WELCOMES THE MARINES TO NEW GEORGIA

As we learned earlier when reading about CAPT Wilfred Painter, on 21 June 1943 two companies of the Fourth Marine Raider Battalion disembarked from the destroyer-transports USS DENT and USS WATERS and landed at Segi Point on New Georgia Island. The Japanese were known to be strongly entrenched on New Georgia and a bitter fight was expected because the island was a vital stepping stone on the road to the Japanese stronghold on Bougainville. The Marines Raiders initiated the U.S. amphibious attack against this strategic island; however, their advance up from the sea went unopposed by enemy gunfire.

As the Marines, dressed in camouflage uniforms and armed to the teeth, advanced toward the tree-line, a lean, gray-haired, figure suddenly emerged from the jungle and walked forward, not to threaten the surprised Raiders but to greet them. The apparition, who looked like an amiable professor even in his high rubber boots and khaki shorts, held out his hand and addressed the Marine commander in the following words: “Colonel, the Navy Seabees are always happy to welcome the Marines to enemy-held territory.” As they shook hands, astonished Marine Lieutenant Colonel Michael Currin could only mutter, “Well, I'll be ....!”

The surprised Marine Raiders owed this unusual reception to a brave officer, LT Robert L. Ryan, CEC, USNR. On 14 June 1943, a week before the Marine landing, the 49-year old Civil Engineer Corps officer from Santa Paula, California, led a reconnaissance party comprising two Army officers and himself ashore on New Georgia. The three men gathered information on landing sites and enemy deployments which was subsequently turned over to the advance survey party led by CDR Painter.

On 25 June LT Ryan returned to his unit, Naval Construction Battalion 47, which was on Russell Island. The battalion then moved in two echelons to New Georgia to build the badly-needed fighter airstrip mentioned in the Painter vignette. LT Ryan returned to New Georgia with the battalion and helped CDR Painter meet the challenge of getting the Segi fighter strip operational in only ten days.

For the zeal and professional skill displayed during his reconnaissance mission on New Georgia, and for his later participation in the construction of the fighter strip, LT Ryan was awarded the Legion of Merit by the U.S. Army, and was also cited by FADM Halsey. It was not inappropriate that the Army should make the award as LT Ryan had also served as a lieutenant in the Army Corps of Engineers -- during the First World War! After World War II, Ryan returned to his home in Ventura County and subsequently became County Surveyor. He did, however, remain active in the Naval Reserve and was promoted to commander in 1951. He died at the age of 60 on 31 July 1954.

LCDR EDWARD S. HOPE, CEC, USNR:
A BLACK PIONEER DURING WORLD WAR II

Although black enlisted personnel served in the U.S. Navy, often in integrated units, during every major war in American history, the Navy had no black commissioned officers until World War II. At the beginning of that conflict, the U.S. War Commission encouraged the armed services to provide equal career opportunities to black Americans. One logical step in implementing this goal was the commissioning of black officers.

In 1943 the Navy began training qualified blacks for officer positions; and in March 1944 the first group of blacks, the "Golden Thirteen," graduated from Officer Candidate School at Great Lakes, Illinois, and received commissions as line officers. A few months later the Navy initiated a program for the selection of black staff corps officers. One of the first to be chosen was Dr. Edward Swain Hope, who was commissioned a Lieutenant in the Civil Engineer Corps Reserve in May 1944. Dr. Hope was not only the first black Civil Engineer Corps officer, but, upon promotion to Lieutenant Commander, also became the highest ranking black naval officer to serve in World War II.

Edward Swain Hope was born the son of Dr. John Hope and Lugenia Burns Hope on 28 August 1901 in Atlanta, Georgia. After completing his early education, he received an A.B. in science from Morehouse College in Atlanta in 1923, and a B.S. and M.S. in civil engineering from the Massachusetts Institute of Technology in 1925 and 1927. During summer vacations Hope gained practical experience working as a carpenter's apprentice and mechanic's helper, finally ending up as a journeyman mechanic. During the summer before undertaking his master's project, he carried out a survey for a water power project for the Grenfell Medical Mission in Newfoundland. This survey formed the basis of his M.S. project. Following graduation from the Massachusetts Institute of Technology, Hope worked on highway construction for a year on Long Island, New York, and then spent three years in Brazil working on hydroelectric development for the American Foreign Power Company. In 1930 the depression ended this employment and Hope returned to the U.S. and became Superintendent of Buildings and Grounds at Howard University in 1932. From 1939 to 1942 he attended the Teachers College of Columbia University where he earned a Ed.D. in personnel administration.

In 1944 Dr. Hope, his wife and two children, were living comfortably at Howard University. At 42, he was already over the draft age, had a good job, and, because of it, had been declared essential to the national health and welfare. Nevertheless, one night he read that the Navy planned to give staff officer commissions to blacks, two of which would be in the Civil Engineer Corps. In his youth, Hope had been entranced by the thought of naval service. He had attended a lecture given by a Navy lieutenant on the cruise of President Theodore Roosevelt's Great White Fleet and still remembered a visit, in the company of an uncle, to a CAPT Small in Beaufort, South Carolina, during which he had held the medal that Small had won for taking the CSS PLANTER during the Civil War.

Inspired by such thoughts and realizing that the Navy would probably have trouble finding qualified black civil engineers, Dr. Hope volunteered for naval service. After passing the physical with flying colors, Hope was sworn in as a lieutenant, the lowest grade that a man his age could hold.

Following training at Camp Endicott in Davisville, Rhode Island, LT Hope was assigned to the Manana Barracks at Pearl Harbor, Hawaii, as Public Works Officer. Manana Barracks primarily housed black sailors who served as stevedores on the Navy docks, although both black and white

sailors were assigned to LT Hope in the Public Works division. LT Hope's duties as Public Works Officer were not much different than those he had performed at Howard University so he quickly adjusted to his new job.

In December 1945 LT Hope flew to Okinawa where he was the first black naval officer to serve as a member of a general court-martial board. During this trip he had an opportunity to see areas that had only recently been forward battle areas. In January 1946 LT Hope was transferred from Manana Barracks to the Navy Pacific University where he was offered a promotion and transportation of his family to Hawaii, if he would stay in the Navy for at least another six months. He accepted the offer and soon became Director of Instruction at the university. His family joined him and he was promoted to lieutenant commander. Some months later, the Navy closed the university and LCDR Hope was reassigned as Assistant Public Works Officer at Pearl Harbor, and was subsequently returned to the continental U.S. with his family for separation.

Just as LDCR Hope was about to sign his separation papers in Anacostia, Maryland, he was ordered to report to Secretary of the Navy James Forrestal, who asked him whether he might like to remain in the Navy. LCDR Hope, however, was determined to return to civilian life, feeling that 47 years of age was rather late to begin a career in the regular Navy. Nevertheless, Hope informed Secretary Forrestal that he hoped younger blacks would seek careers as Navy officers and that he would be willing to do whatever he could to encourage this. As a result of this offer, LDCR Hope was sent on a speaking tour of black colleges to "show the uniform" and make own the benefits of a career as a Navy officer.

LCDR Hope was finally released from active duty in February 1947. He returned to Howard University where he was appointed professor of civil engineering. He remained active in the Naval Reserve until the late 1950s when he was appointed Chairman of the Civil Engineering Department of the American University of Beirut in Lebanon.

ENS LAWRENCE S. KARNOWSKI, CEC, USNR,
AND NAVAL COMBAT DEMOLITION UNIT 45

It is not widely known, but there were Civil Engineer Corps officers among the very first men to go ashore at Normandy on D-Day, 6 June 1944. These officers commanded Naval Combat Demolition Units which had the extremely hazardous mission of going ashore before the assault troops and blowing gaps in enemy beach obstacles. Failure to neutralize these beach obstacles would have turned the Normandy invasion into a disaster. The demolition units did their work under heavy enemy artillery, mortar, and small arms fire and consequently they suffered very heavy casualties. One of the Civil Engineer Corps officers who went ashore on that cold, wet morning of 6 June was ENS Lawrence S. Karnowski, the Officer in Charge of Naval Combat Demolition Unit 45. His performance that day went far beyond anything that could be expected of a man in combat and earned him the Navy's second highest award, the Navy Cross, “for extraordinary heroism.” This is his story.

Lawrence Karnowski was born on 1 October 1916 in Tampa, Kansas. After graduating from high school, he attended the University of Kansas where he graduated with a degree in civil engineering. He subsequently worked for the Army Corps of Engineers as a civilian engineer.

Karnowski joined the Navy in June 1943 and received a commission in the Civil Engineer Corps Reserve. After completing orientation and training at Camp Peary, Virginia, he volunteered for the naval demolition units being formed to go in ahead of landing troops and destroy beach obstacles. On 2 November 1943 ENS Karnowski left Camp Peary to begin demolition unit training at Fort Pierce, Florida.

The mission of the demolition units that operated in the Atlantic Theater was unique because these units performed assault demolition in contrast to the Pacific Theater units which performed reconnaissance and pre-assault demolition. The training facility was established at Fort Pierce, Florida in June 1943 and the first class arrived and assembled for training at the beginning of July. The personnel were drawn from the Naval Construction Battalions, and the bomb and mine disposal schools, because it was felt that such personnel would already be familiar with explosives and basic demolition. The site chosen for training offered natural swimming beaches and temperatures that allowed year-round swimming. However, the physical conditions in which the men lived and the training itself were very arduous.

After his arrival at Fort Pierce, ENS Karnowski was made Officer in Charge of newly-formed Naval Combat Demolition Unit 45. The unit consisted of Karnowski and five enlisted men: two Seabees, a Carpenter's Mate 1st Class and a Metalsmith 2nd Class, and three Seamen 2nd Class.

Following demolition training, NCDU-45 shipped over to England and was attached to the 6th Beach Battalion of the 11th Amphibious Force to prepare for the Allied invasion of France, planned for the summer of 1944. Further intensive training followed at the Assault Training Center, Willacombe, England. During this period Allied reconnaissance ascertained that the enemy had greatly increased the number of obstacles on the target beaches. It was clear that additional numbers of trained men would be needed to reinforce the NCDUs, if the beaches were to be cleared. Therefore, on 26 April a corporal and four privates from the Army combat engineers were assigned to NCDU-45 and trained to perform the demolition mission. On 5 May an additional five sailors from a general personnel pool were also assigned to NCDU-45, bringing it to a total strength of one officer and seventeen men. NCDU-45 was subsequently assigned to Force “0” which would assault "Omaha" beach during the Normandy landings.

On 1 June 1944 NCDU-45, an Army demolition unit of 26 men, and three M4 "General Sherman" tanks (one with a dozer blade), all boarded LCT(A) 2425. The Army and Navy demolitions teams were known collectively as Boat Team #10 because they would go ashore aboard LCM 10 which was being towed by LCT(A) 2425. The LCM was loaded with the boat team's explosives and equipment. The tanks were placed forward on reinforced ramps on the LCT so that their 75-mm guns could provide covering fire as it approached the beach. On that same date, ENS Karnowski and his fellow officers in charge were taken aboard the USS ANSON for their first and only briefing before the attack. The briefing was conducted by LCDR Joseph H. Gibbons, USNR, the commanding officer of Group 2, Force "0," and RADM John L. Hall, Jr., USN. The latter assured the assembled officers that the pre-invasion bombardment would be so intense that "not a living soul" would be left on the beach.

The assault plan called for the NCDUs and Army demolition units to land at H-hour plus 3 minutes and each clear an initial 50 yard gap in the beach obstacles. As a preliminary, an air and sea bombardment would begin 24 hours before the assault and continue right up to H-hour at 0630. At H-hour plus 15 minutes, the 32 tanks on the LCTs would land and provide fire against specific obstacles. The tide was to be at low ebb and just beginning to rise. The plan would have worked well; however, it made no provision for bad weather.

Upon return to the LCTs, the officers in charge briefed their men; however, no one was led to believe that the operation would be easy. In light of subsequent events, this proved a wise decision. On 4 June the LCTs with the loaded LCMs in tow and the NCDUs and Army units aboard started across the channel. However, the good weather of the previous 24 hours deteriorated so rapidly that, at midnight on 5 June, the Supreme Commander ordered the operation postponed for 24 hours. All vessels had to return through the rough seas to their starting points and await further orders. This forced the personnel aboard the LCTs to suffer an extremely wet and cold ride many hours long. The men crowded aboard the LCTs were forced to sleep on decks which were frequently awash and they had insufficient rations. Conditions were so bad aboard LCT(A) 2425 that the personnel had to drink contaminated water purified with chloride tablets. When the LCT reached Portsmouth on the afternoon of 5 June, the men were informed that D-day had been moved to 0620 on 6 June, and that they would remain aboard the LCT until it sailed for France again.

Things went little better during the second passage to France. The sea was still extremely rough and conditions aboard the LCTs remain severe. In some instances, the towed LCMs broke loose from the LCTs and were lost, while in other instances, the LCTs broke down and the demolition units had to board the LCMs which proceeded under their own power. This was done without food or protection from the spray and sea which rendered the personnel cold, wet, and seasick -- not in the best condition to carry out their mission. Nevertheless, despite these difficulties, the demolition units made an orderly departure from the transport area and the first wave went ashore from 0633 to 0635.

Joint Army-Navy Boat Team #10 transferred from LCT(A) 2425 to LCM 10 at 0230 hours. LCM 10 then joined with LCM 15 and 16 and proceeded toward shore. At 0545 the men sighted "Omaha" beach and at 0610 beach sector "Easy Red" and the unit's assigned gap-area. The LCM touched shore and dropped its ramp at exactly 0625 and Boat Team #10 disembarked and unloaded two rubber boats, one of which was allowed to drift down the beach and the other was moored to a piling. Unfortunately for demolition personnel, the naval gun fire, rocket barrages, and aerial saturation bombardment had not destroyed the German defensive positions above the beach line. Although the Germans did not fire during the approach of the LCM, as soon as its

ramp dropped they opened a withering fire. Enemy fire was constant and heavy, consisting of machine guns and 88mm cannons. The three tanks disembarked at 0640, shelling the hills as they came ashore, and the LCM pulled out to sea and safety. The tanks took positions to the left and right of where the gap would be blown in the obstacles and continued shelling and using their machine guns in an attempt to set off German teller mines. Despite the heavy enemy fire, the Army and Navy demolition teams proceeded toward their objectives. The demolition personnel had to blow gaps in three bands of obstacles with three rows of obstacles in each band to open the beach for the landing troops waiting offshore. Under constant, severe enemy fire they succeeded in destroying the obstacles. Charges were placed and the first was detonated at 0650, the second at 0700, and the third at 0710. A fourth charge was set but not detonated because assault infantry was already landing and taking cover behind the targeted beach obstacles.

Constantly exposed to heavy artillery and small arms fire, ENS Karnowski coolly and skillfully directed the clearing of the fifty-yard gap in the beach obstacles. In the process, he saw a wounded member of his unit about to drown in the rising tide and, at great personal risk to himself, rescued the man. ENS Karnowski returned alone to the demolition work, repeatedly placing charges to widen the gap in the obstacles. The tide was rapidly rising and the surviving demolition personnel found themselves swimming rapidly in the deepening water to place charges on obstacles not yet cleared. These were finally cleared up to the dune line, but the gap was not widened until the next day when the remaining men of NCBU-45 cleared mines and obstacles on the left flank. When hazardous tidal conditions prevented further demolition, ENS Karnowski remained on the beach in complete disregard for his personal safety to aid the wounded and evacuate casualties. The citation in which the President later awarded him the Navy Cross, describes Karnowski as "a bold and resolute leader, [who) by his indomitable aggressiveness, self-sacrificing conduct, and unfailing devotion to duty, upheld the highest traditions of the United States Naval Service." Karnowski was the first of only two Civil Engineer Corps officers to win the Navy Cross in World War II. He was not, however, the only hero that day, one of his petty officers, a Seabee Metalsmith 1st Class, named Lester J. Meyers, won the Silver Star for similar acts of heroism.

Following the war, Karnowski returned to civilian employment with the Corps of Engineers, after a brief time with a private engineering firm. He also remained active in the Civil Engineer Corps Reserve and was called to active duty from 1951 to 1953 for the Korean War. After leaving active service, he went to work for the Deputy Public Works Officer, Eleventh Naval District, and subsequently found himself an employee of the Bureau of Yards and Docks, at the Southwest Division. He continued his employment with the Bureau of Yards and Docks and the Naval Facilities Engineering Command and was awarded the Southeast Asia Civilian Service Award for on-site work in Thailand during the Vietnam conflict. He also continued his service in the Civil Engineer Corps Reserve, rising to the rank of commander.

Nevertheless, no matter what followed, his actions on that awful morning of 6 June 1944 on “Omaha” beach should never be forgotten by the Civil Engineer Corps -- for Lawrence S. Karnowski is truly one of the heros of the corps.

PRISONERS OF WAR

For fifteen Civil Engineer Corps officers World War II meant the grueling ordeal of the prisoner of war, an ordeal that six of the fifteen did not survive. With one exception, at the outbreak of the war, these officers were on duty in the Philippines, and on Guam and Wake Island; all were captured by the Japanese and became prisoners of war.

On 7 December 1941 ten Civil Engineer Corps officers were on duty in the Public Works Department of the Cavite Navy Yard in the Philippines. Three of the officers, CDR James D. Wilson, CEC, USN, the Public Works Officer of the Navy Yard and Sixteenth Naval District; LTJG Daniel R. Dorsey, CEC, USNR; and ENS Robert B. Hollister, CEC, USNR, were either evacuated or managed to evade capture and eventually make their way to Australia. The remaining seven officers, LT James R. Davis, CEC, USN; LT Roy D. Gilbert, CEC, USNR; LT Benjamin D. Goodier, CEC, USNR; LT Jerry A. Steward, CEC, USNR; LTJG Cecil J. Espy, Jr., CEC, USNR; LT George H. Greenwood, CEC, USNR; and ENS William R. Yankey, CEC, USNR, were taken prisoner.

Another man, LCDR Charles B. Snead, CEC, USNR, was sworn into the Civil Engineer Corps on 2 May 1942 on Corregidor; he had previously been the Assistant Cavite Project Manager for Pacific Naval Air Bases, the civilian contractor consortium which was building bases throughout the Pacific area at the time.Following the collapse of U.S. resistance in the Philippines, he too was taken prisoner.

On 10 December 1941, when the Japanese attacked Guam, four Civil Engineer Corps officers were assigned to the Naval Station there: CDR Richard F. Armknecht, CEC, USN, the Public Works Officer; LTJG Jack W. Schwartz, CEC, USNR; ENS Francis J. Carney, CEC, USNR; and ENS Frank Wolfsheimer, CEC, USNR. CDR Armknecht was absent from the island at the time of the attack; the other three officers were taken prisoner.

When the Japanese took Wake Island on 23 December 1941, LCDR Elmer B. Greey, CEC, USNR, the Resident Officer in Charge of Construction, and his assistants, LTJG James B. Robinson, CEC, USNR; ENS Robert C. Walish, CEC, USNR; and ENS Belmont M. Williams, CEC, USNR, were overseeing contractor construction there. All four officers were taken prisoner.

Finally, there was LCDR Allan T. Sylvester, CEC, USNR, who was residing with his wife in Manila when the Japanese attacked. At 56 years of age, he was in an inactive status and was never called to active duty. As a U.S. national he was imprisoned at a civilian camp in the Philippines until the islands were liberated. Unlike the above officers, he was not technically a prisoner of war because he was not on active duty when interned.

The fifteen active-duty officers taken prisoner underwent a variety of experiences during their captivity. LCDR Snead, LT Davis, LT Espy, LT Gilbert, LT Goodier, LT Greenwood, LT Steward, and ENS Yankey were imprisoned in POW camps in the Philippines. In September 1942, LT Gilbert was captured while trying to escape and executed. LT Steward and ENS Yankey spent the entire war imprisoned in the Philippines and were liberated by U.S. forces in January 1945. However, LCDR Snead and LT Davis were sent to camps in Japan in October 1942.

In January 1943 LCDR Snead died at Ofuna Prison on Kyushu of paralysis caused by diphtheria, having already been ill of malaria and beriberi since October 1942. LT Davis was imprisoned at the Shimogawa Prison Hospital, and was subsequently liberated by U.S. forces in September 1945. The remaining three Civil Engineer Corps officers captured in the Philippines, LT Espy, LT

Goodier, and LT Greenwood, were placed aboard ship for transfer from the Philippines to Japan in December 1944. U.S. aircraft sank the ship before it could leave the Philippines. The surviving POWs, including the three Civil Engineer Corps officers, were transferred to another ship which made it as far as Formosa before it too was sunk. LT Greenwood was killed during this second attack. The surviving POWs were transferred to yet a third ship and completed the voyage to Japan. LT Goodier, however, who had spent time in the water during the earlier sinking and who had lost all his clothing, died of exposure and exhaustion shortly before reaching Japan. LT Espy was sent to a camp near Mogi, where he died of pneumonia shortly after arriving.

In January 1942 LT Schwartz, ENS Carney and ENS Wolfsheimer were sent from Guam to the Zentsuji Prison on Shokaku Island, Japan. They were moved to several other camps in Japan and, in July 1945, ENS Carney was killed along with several other POWs when their air raid shelter was hit by a bomb during an air raid. The other two Civil Engineer Corps officers were liberated by U.S. forces in September 1945.

In early 1942 LCDR Greey, LTJG Robinson, ENS Walish, and ENS Williams were shipped from Wake Island to camps near Shanghai, China. Their place of incarceration changed several times during the war, moving to the Peking area, Korea, and finally Japan. They were liberated in September 1945 by U.S. forces.

Although not a Civil Engineer Corps officer, ENS Arthur G. Beale, USN, also deserves mention. ENS Beale arrived at Cavite, the Philippines, in November 1941 and was assigned to the Public Works Department. In December 1941 he and some of his Civil Engineer Corps comrades moved to Corregidor and were later taken prisoner when that bastion of resistance surrendered. Although not a member of the corps, ENS Beale worked and later suffered alongside the Civil Engineer Corps officers assigned to the Cavite Public Works Department; and, at the end of the war, provided information about their fate.

While the Pacific War was bad enough for active combatants, it was especially bad for U.S. prisoners. Malnutrition, insufficient clothing and shelter, physical and mental abuse, prolonged separation from loved ones, lack of information, and the uncertainty of serving what amounted to an indeterminate sentence took a terrible toll. Added to this was the hazard that prisoners faced from Allied bombers and submarines when at sea or in the camps. In the end, the death rate for Civil Engineer Corps POWs was a flat 40 percent!

World War II gave the Civil Engineer Corps one final prisoner of war: CDR Charles Curione, CEC, USN. CDR Curione, however, was not a member of the corps at the time he was made a prisoner of war. While a member of the U.S. Army Eighth Air Force and a navigator aboard a B-17 "Flying Fortress," Curione was shot down over Hamburg, Germany, in June 1944, and spent the remainder of the war in a German POW camp. In .June 1947 he entered the Civil Engineer Corps as an Ensign and subsequently retired with the rank of commander.

The nine Civil Engineer Corps officers who survived their imprisonment all had one thing in common: they chose either to make the Navy their career or remain active in the Naval Reserve. LT James Davis, the only regular officer in the group, retired as a rear admiral. Four of the reserve officers made the Navy a career and retired as regular officers. They were LCDR Greey and ENS Yankey, both of whom retired as captains; and LTJG Schwartz and LTJG Robinson, both of whom retired as commanders. LT Jerry Steward, who won the Navy Cross and other decorations for his actions during the initial Japanese attack on Cavite and who was the most decorated Civil Engineer Corps officer of World War II, retired in the reserve as a rear admiral. ENS Walish, ENS Williams, and ENS Wolfsheimer all retired as commanders in the reserve.

LCDR Sylvester, who spent the war as a civilian internee, received an honorary retirement from the Naval Reserve in 1951 in the rank he held at the beginning of the war.

Those Civil Engineer Corps officers who spent the war as prisoners of the enemy bore a great burden. Nevertheless, it is clear from their subsequent service that the ordeal endured so bravely by these men did not dampen -- and perhaps even strengthened -- their desire to serve their country.

THE KOREAN WAR:
THE INCHON LANDING, THE “GREAT TRAIN ROBBERY” AND AIRFIELD CONSTRUCTION

Originally established as a wartime expedient, the Seabees more than proved their worth during World War II, and were made a permanent part of the Navy in 1947. As a result, the Civil Engineer Corps was permanently transformed from a staff corps of essentially noncombatant specialists with no right of command into a corps of officers who exercised command over Navy units in both noncombat and combat situations. The first test of the new regular Navy Seabees proved to be the Korean War.

On 25 June 1950 the armed forces of the communist People's Democratic Republic of Korea invaded the non-communist Republic of Korea to the south. Thus, the war between North and South Korea began, and both U.S., United Nations and Chinese communist forces would be drawn into the conflict before it ended in 1953. After the initial success of the North Koreans, General of the Army Douglas MacArthur determined to carry out an amphibious landing at Inchon, behind the North Korean lines, to disrupt the enemy's logistic support. The Seabees played a pivotal role in this landing.

During the summer of 1950, Naval Construction Battalion 104 engaged in amphibious exercises and training which culminated in practice landings at Coronado. The battalion had been reestablished on 6 March 1947 with the mission of assembling and placing pontoon structures, beach rehabilitation, harbor development, salvage, material handling, and the training of reservists in all these operations. The new battalion's first commanding officer was CDR Alexander C. Husband, CEC, USN, who would later be the Commander of the Naval Facilities Engineering Command (the new name of the Bureau of Yards and Docks from 1966) during the Vietnam War. During the three years following its reestablishment, NCB-104 developed proficiency in its specialized mission through intensive training and participation in landing exercises with the Marines and Army in California, Hawaii, and Alaska. Given its amphibious landing specialty, NCB-104 was ordered to Korea to support the Marines during the Inchon landing.

NCB-104 sailed for Yokosoka, Japan, in three echelons on 26 July, 7 August, and 14 August 1950. At Yokosoka the pontoon equipment was combat loaded in record time and the battalion sailed aboard two LSTs for Korea and Inchon. During the first phase of the assault on 15 September, NCB-104 helped take Wolmi Do, an island connected by a causeway to shore and which formed part of the Inchon harbor breakwater. After this, the Seabees moved against the two targeted landing areas, “Red Beach” and “Blue Beach,” which were located just to the north and south of Inchon proper. The landing was very difficult because the beaches were such in name only. At “Red Beach” there was only a seawall, and the tide ran to 30 feet. The landing craft had to come in at high tide because that was the only way they could reach the beaches.

The Seabees came ashore with the Marines and quickly assembled long pontoons causeways so that unloading of equipment, supplies, and reinforcements could proceed across the huge mud flats left in the wake of the outgoing tide. On D-day plus one, the battalion emplaced a dock section for tide-level landings and General MacArthur came ashore across it the following day. The high tides, the seawalls, and enemy resistance made the Inchon landing a. very hazardous operation. Nevertheless, although a high-risk operation, it was a brilliant success. U.S. forces cut the North Korean supply lines and the communist offensive collapsed.

By 1 October NCB-104 had started loading ships for an amphibious landing at Wonsan, located on the upper east coast. The battalion subsequently participated in the landing and later

evacuated casualties. On 30 October 1950 NCB-104 got a new name; it was redesignated Amphibious Construction Battalion 1, the title that it still bears today. On 1 November all elements of ACB-1 were reassembling at Yokosoka; their role in the war was over. For their performance during the Inchon landing, the men of ACB-1 earned three bronze stars, eight commendations with Combat "V", the Presidential Unit Citation, and the Korean Presidential Unit Citation.

A few days after the Inchon landing one of those events so characteristic of the Seabees took place. Air reconnaissance reported that eight switcher locomotives were trapped by cut rail lines in a rail yard at Yong Dong Po, which was on the American line of advance. A Seabee chief petty officer, who was a former railroad man, volunteered to go forward, seize the locomotives, and bring them back to the U.S. lines. The chief and eight fellow volunteers crossed the enemy lines, made their way to Yong Dong Po, and found the locomotives standing in the switching yard of the Kirin Brewery. The Seabees, taking advantage of their good fortune, loaded 15 cases of beer and sake aboard the locomotives, got up steam, and left. On the way back they were first fired upon by North Korean infantry and later by advancing U.S. Marines. The Marines thought that the North Koreans were using the locomotives to mount an attack, and opened fire on the locomotives until they finally recognized that the occupants were wearing U.S. uniforms. The Seabee chief subsequently admitted that sampling the beer and sake back at the brewery may have encouraged the Seabees to greater effort in getting the trains back to the U.S. lines.

In addition to the amphibious operations, Seabee detachments from ACB-1, NMCB-2, and a new unit, Construction Battalion Maintenance Unit 1, provided support at Marine Air Group airfields at Pohang, Kimpo, Seoul, Taegu and other locations. When the battle lines of the U.N. and communist forces stabilized at the 38th parallel, the need arose for an emergency landing field for damaged aircraft returning from raids in the north and unable to reach their airfields or carriers. The project was given the code name "Crippled Chick" and Yo Do, an island in Wonsan Bay, was selected as the site. Yo Do and other islands in the bay had been captured by South Korean forces two years earlier. The South Koreans were currently using the islands as positions from which to maintain the siege of Wonsan. Three officers and seventy-five men from ACB-1 were sent to Yo Do with orders to have an emergency airstrip operational in 35 days. They completed it in only 16 days while under constant enemy artillery bombardment!

Thus, the new Seabees of the regular Navy displayed that same "Can Do" spirit made famous during World War II.

THEY MOVED A MOUNTAIN:THE CONSTRUCTION OF THE NAVAL AIR STATION, CUBI POINT, THE PHILIPPINES

One of the most ambitious construction projects in the history of both the Civil Engineer Corps and Seabees came along four years after the latter had achieved regular Navy status: the construction of the Naval Air Station at Cubi Point, Subic Bay, in the Philippines. Even today, this tasking remains the single largest earth-moving project ever undertaken by the U.S. Navy.

The Korean War emphasized the need for a Naval Air Station located close to the trouble spots of southwest Asia. ADM Arthur W. Radford, USN, then Commander in Chief of the Pacific Fleet and later Chief of Naval Operations, conceived the Cubi Point project. Cubi Point was originally a rugged, jungle-covered finger of land jutting out in a seaward direction from the eastern part of Subic Bay, located across the bay from the U.S. Naval Station, Subic Bay, about 50 miles north of Manila. It was selected as the most strategic and typhoon-sheltered location for the required combination of seaplane, land plane, and carrier operations that were deemed essential to the proposed Naval Air Station's mission. Cubi Point seemed a natural choice and subsequent history has affirmed the selection of this location. Although the location was excellent for operational reasons, constructing the air station involved enormous difficulties because of the jungle-covered, mountainous terrain of the site.

Despite the anticipated difficulties, the Cubi Point project was approved in 1951 and it was decided that Navy Seabees would carry out the project. During the summer of 1951 LCDR Frank C. Randall, CEC, USNR, Officer in Charge of Construction Battalion Detachment 1802 made an initial survey of the site. In September CDR James Douglas, CEC, USN, stepped ashore at Cubi Point; he was Commanding Officer of the Philippine Construction Regiment which was later redesignated the 30th Naval Construction Regiment. He was there to carry out the order to move a mountain and build an airstrip. Less than a month later, CDR Douglas was joined by LCDR Edwin I. Mosher, CEC, USNR, and the men of Naval Mobile Construction Battalion 3. Within a month of the arrival of NMCB-3, LCDR Herbert W. Whitney, CEC, USNR, and the Seabees of NMCB-5 arrived. Both battalions had only recently been established because of the Korean War emergency. Eventually, Seabees from NMCB-2, 5, 9, and 11, Det ABLE, and Construction Battalion Detachments 1802 and 1803 would join the men of NMCB-3. Together these units would carry out one of the largest earth-moving projects in the world.

The Seabees met problems peculiar to the climate and location as they arose. Before living quarters could be built or airstrip construction begun, the Seabees had to fight off monkeys, pythons, wild pigs, and carabaos. Soon after landing, the Seabees were told of the presence in the area of roving bands of Huks, Philippine communists. The natives told the Seabees that the Huks constantly raided and pillaged communities in the region and that the Americans were welcome as protection against the Huk depredations. Although Huks were known to be in the area until the latter part of 1953, there were no clashes with U.S. personnel.

Seabees from NMCB-3 and NMCB-5 surveyed the area which consisted of rocky, rolling terrain, covered by nearly impenetrable jungle, sloping down from the adjacent mountains. This was seemingly the last place in the world to build an air base. The first problem encountered involved moving the native fishing village of Banicain and its nearby cemetery to the community of Olongapo, five miles distant. Today, the site of the village lies under 45 feet of earth. During the initial start-up of the project, the Seabees of NMCB-3 began to clear roads and build a 600-man camp on a hill overlooking the proposed airstrip site. They also began construction of a dam and reservoir to assure a water supply for both men and machines. Thereafter, both NMCB-3 and NMCB-5 worked on the airstrip, although NMCB-3 had overall supervision of that

aspect of the project. In the meantime, completion of the tent camp allowed the men to move ashore from a floating barracks where they had been temporarily berthed. This was soon followed by the assembly of a rock crusher by NMCB-5 and the beginning of quarry operations at Mancha Bluff. During the following months, the crusher and quarry would produce thousands of yards of crushed stone and riprap, the basic materials for the huge construction program.

During the rest of 1952, the Seabees worked at top speed to enlarge the camp facilities and arrange the disposition of ten thousands of cubic yards of coral spewed forth by the dredge NORFOLK. The coral was used for base course, hydraulic fill, and miscellaneous projects. Basically, the construction problem was one of creating land where none existed and leveling off the ragged foot of a jungle covered mountain. Hydraulic fill was taken directly from the floor of the ocean by a special machine from which extended a long hose containing a basket-shaped muzzle with rows of teeth that ground into the coral and rock bottom of the sea. This material was piled close to the beach and formed the foundation of the airstrip. By 10 May 1952 the Seabees had built and graded enough of the airstrip to enable the first small airplane to land on the subgrade.

In June 1952 NMCB-2 arrived from Port Hueneme and took over the Mount Maritan project, which required the removal of approximately 85 feet, totaling 212,000 cubic yards of rock, from the top of the mountain which obstructed the glide path approach to the airstrip. Next, the battalion had to dry-fill a swamp and erect a temporary petroleum tank farm there. Meanwhile the Seabees of NMCB-5 earned the sobriquet “Waterfront Gang” for their construction of piers, sheet-pile wharves, and bridges at Cubi Point.

After a year of work, the airstrip was a red scar across land once covered by jungle. The second dry, or construction, season marked the arrival of the Seabees of NMCB-9.After building their own tent area, the newcomers were assigned projects which included construction of a permanent water supply system for the Naval Station, Subic Bay, and the construction of the first three permanent buildings at Cubi Point: two enlisted barracks and a subsistence building. In addition, NMCB-9 erected a concrete block plant. In January 1953, NMCB-3 completed the asphaltic concrete mixing plant and, within a month, Seabees began paving the airstrip with hot mix from this plant. On 22 April 1953 ADM Radford had the distinction of being a passenger in the first aircraft to land on the paved airstrip.

NMCB-2 started another phase of the project during the first part of 1953 when it began construction of an ammunition area at Camayan Point. Additional Seabee units arrived, including Construction Battalion Detachment 1802, and contributed to the surveys of this ten-square mile area of rough terrain, heavily overgrown with jungle. Meanwhile a portion of NMCB-5's “Waterfront Gang” moved out to Camayan Point and began building an ammunition pier.

When the rainy season arrived, all the battalions returned to their home ports, except for NMCB-9 which remained to work on the most urgent projects. In October 1953 CAPT Madison Nichols, CEC, USN, became Commander of the 30th Regiment and NMCB-2, 3, 5, and 11 returned from homeport, and NMCB-9 returned to the U.S. During the following dry season, NMCB-2 built a road through the jungle between Cubi and Camayan Points and began construction of permanent water reservoirs and pipelines. NMCB-11 continued work on the permanent buildings and NMCB-3 continued work on the runway, including grading, paving, runway drainage, and taxiway and parking area construction. NMCB-5 began work on another important project, the carrier wharf.

In June 1954 CAPT Stanley P. Zola, CEC, USN, relieved CAPT Nichols as regimental commander and was in turn relieved by CAPT Neil E. Kingsley, CEC, USN, in September. That October, NMCB-2 returned and relieved NMCB-5 and shortly thereafter NMCB-3 relieved NMCB-11. In January 1955 NMCB-5 and NMCB-9 returned simultaneously and the fourth construction season began in earnest as work continued on existing projects. Work on the Cubi Point facilities continued into a fifth season and the Naval Air Station was finally officially commissioned on 25 July 1956. The Seabees witnessed the ceremony in which ADM Radford and Philippine President Ramon Magsaysay were honored guests.

The five years of construction represented a tremendous man-hour and material investment on the part of the Civil Engineer Corps and Seabees. By May 1953, 3,000 Seabees were involved in the construction effort, each man averaging a 48-hour work week. The first two years of the project were the toughest; the Seabees lived in tents and fought heavy rains, insects, dust, mud, and a water shortage while they filled in sections of the bay up to 98 feet deep and excavated 23 million cubic yards of earth to build the airstrip. In the process, they built 15.3 miles of roads through the jungle, laid 36,000 tons of asphaltic concrete, used 1 million pounds of dynamite to quarry 1 million cubic yards of rock, and moved 15 million cubic yards of hydraulic fill. More than 1 million sacks of cement were used on the project before it was over. During the course of the project, cement, steel, heavy equipment, personnel and supplies had to be transported 7,000 miles from the U.S. to the Philippines. More than 1,000 pieces of equipment were shipped to the site during the five year construction period. An additional problem was the need for keeping on hand a spare parts supply worth approximately $1 million. The Seabees overcame this problem by building a warehouse, comparable in size to a six-story commercial retail store, which housed 75,000 different items.

The Cubi Point project represented a bold experiment in training and construction. The main problem was moving a mountain and building up land from the sea using only three modes of excavation: shovels and trucks, self-propelled scrapers, and tractor-drawn scrapers. The project cost $80 million not including the hidden costs such as housing and feeding personnel and taking care of their medical needs. The five-years of carving a Naval Air Station from the difficult Cubi Point site was very satisfying for the participants, not least because some civilian contractors described the job as “impossible to accomplish.” Each working day provided new challenges and headaches, but the Seabees doggedly pushed on, resolving the problems as they emerged and demonstrating anew the "Can Do" spirit.

THE CIVIL ENGINEER CORPS AT THE OTHER POLE: OPERATION DEEPFREEZE CONSTRUCTION

In the tradition of RADM Robert E. Peary, other Civil Engineer Corps officers, this time accompanied by Seabees, headed for freezing cold climes in the mid-1950s. This time, however, the destination was the Antarctic rather than the Arctic.

In 1954 the Department of Defense agreed to furnish logistic support for Antarctic research planned for the International Geophysical Year, which was to begin on 1 July 1957. The Navy was designated to carry out this mission and in September 1954, Navy Task Force 43 set out for Antarctica to begin building the necessary research and support facilities. The task of construction fell naturally enough to the Bureau of Yards and Docks and to the Seabees. In February 1955 Mobile Construction Battalion (Special) was formed at the Naval Construction Battalion Center, Davisville, Rhode Island, and with technical assistance from the Bureau of Yards and Docks, plans were made for the construction and maintenance of the Antarctic stations.

The first deployment of Mobile Construction Battalion (Special) in 1955, known as “Deepfreeze I,” called for the establishment of two stations, one at Kainan Bay (Little America) and the other at McMurdo Island. The battalion wintered over at these two stations and built the Byrd and Pole stations during Deepfreeze II (1956-57). All this construction was done under very severe conditions, some of the worst ever encountered by the Civil Engineer Corps and Seabees. Temperatures could fall as low as 100 degrees below zero and the severe cold put great strains on both men, material, and equipment. By the start of the International Geophysical Year in 1957, the necessary facilities were ready and the battalion's mission had become station maintenance. Deepfreeze III and Deepfreeze IV were primarily resupply missions and the latter was supposed to mark the termination of the program and the closing of the bases.

Events, however, took a different course. The scientific community wanted to do further research in the Antarctic and, thus, the U.S. government decided to continue the program indefinitely, albeit at a reduced level. By 1959 Naval Mobile Construction Battalion (Special) had been replaced by Antarctic Support Activities, still homeported out of Davisville. That same year, Detachment ALFA of this unit was established at Davisville to serve as a wintering over force. The mission of Antarctic Support Activities was to operate and maintain station facilities and provide logistic support for the accomplishment of U.S. scientific programs in Antarctica. Antarctic Support Activities deployed annually to Antarctica in September and returned in March, leaving Det. ALFA to maintain the stations during the austral winter. During this period regular Naval Mobile Construction Battalions deployed to Antarctica to carry out needed construction. Beginning in 1960 Deepfreeze operations were named after the fiscal year. During Deepfreeze 60 NMCB-6 built a new above-ground station on the Palmer Peninsula and the following year built the first highway in Antarctica. New docking facilities were built at McMurdo as well as a new dispensary, and generator and water distillation plants. The year 1962 saw the construction of the first nuclear power plant to operate in Antarctica. The facility was built at McMurdo Station and operated by the Naval Nuclear Power Unit, a subordinate organization of the Bureau of Yards and Docks. The PM-3A reactor supplied 60 million kilowatts hours of electricity and 13 million gallons of potable water (produced from seawater) to McMurdo Station between 1962 and 1974, when it was finally shut down.

During Deepfreeze 67 a newly established Seabee unit, Naval Construction Battalion Unit 201, joined the Naval Support Force, Antarctica (previously Antarctic Support Activities). Prior to 1967 regular battalions on a rotating basis had deployed to Antarctica; however, the Navy

decided that a unit specialized solely for Antarctic construction would be more effective in the unusual and hostile environment that exists at the South Pole. During the following years, CBU-201 completed numerous projects, including personnel housing, warehouses, and scientific research facilities. The major problem that plagued the Seabees of the unit was the lack of sufficient construction time for the projects planned. Adverse weather and material status worked to reduce the already limited time available, so that projects had to be completed over successive Deepfreeze deployments. In 1971 CBU-201 began construction of a new South Pole station, designed by the Naval Facilities Engineering Command, and several other projects were completed. Finally, after five straight years of Deepfreeze deployments, CBU-201 was disestablished at end of Deepfreeze 71.

During Deepfreeze 72, a regular Seabee battalion, Naval Mobile Construction Battalion 71 performed necessary construction and maintenance under the Deepfreeze program. Seabee participation in unit strength continued for two more years, finally ending in 1974. Beginning with Deepfreeze 75 all construction work for the Naval Support Activity and the National Science Foundation was done by contract. Only a few Civil Engineer Corps officers and Seabees remained and they were assigned to public works activities.Despite the phase out of Seabee unit support, the Naval Facilities Engineering Command remained active in the Deepfreeze program. The 1975 mission reduction at the Naval Construction Battalion, Davisville, however, made necessary the transfer of the Command's support activities to the Naval Construction Battalion Center at Port Hueneme, California. The experimental air squadron assigned to the Deepfreeze force was transferred to the Naval Air Station at nearby Point Mugu, California. Thus, large-scale Civil Engineer Corps and Seabee participation in construction at the bottom of the world came to an end after more than a quarter of a century of effort under some of the most hostile conditions imaginable.

SEABEE TEAM 1104 AND THE BATTLE OF DONG XOAI

While Civil Engineer Corps officers and Seabees were working in the freezing cold of Antarctica in the mid-1960s, in a much warmer clime a new war was beginning. The Vietnam War would see a massive effort by Civil Engineer Corps officers working for the Naval Facilities Engineering Command as well as those serving with the Seabees. However, during the early days of the conflict, before the massive U.S. involvement of the late 1960s, a battle took place that will be forever immortalized in the history of the Civil Engineer Corps and Seabees: the battle of Dong Xoai.

On 9 June 1965 LTJG Frank A. Peterlin, CEC, USNR, and his Seabee Technical Assistance Team 1104 were in the process of constructing and improving the facilities of a Civilian Irregular Defense Group Camp (CIDG) adjacent to the village of Dong Xoai, 55 miles north of Saigon, Republic of Vietnam. The camp housed two CIDG companies, a Regional Forces company, a Vietnamese Special Forces company, an armored car platoon, a 105 mm howitzer battery, and the District Headquarters.

On the faithful night of 9 June, 9 members of Seabee Team 1104, 11 members of U.S. Army Special Forces “A” Team 342, and a Vietnamese defense force of approximately 400 men were in the camp. Just before midnight elements of the Viet Cong 9th Division, later estimated to be a reinforced regiment of approximately 2,000 men, launched an attack on the camp. The attack was initiated by a mortar and recoilless rifle barrage which almost immediately hit the buildings housing the camp's communication equipment, aid station, and U.S. personnel; the radio was knocked out, medical supplies destroyed, and many of the Americans were killed outright or wounded. The U.S. and Vietnamese personnel, including ambulatory wounded, manned the defensive berms and returned fire. For the next three hours the enemy poured mortar, recoilless rifle, machine gun and small arms fire into the camp. During this period LTJG Peterlin, four of his Seabees, and five Special Forces men took up defensive positions at the north end of the camp.

During the first moments of the attack, Captain Stokes, the commander of the Special Forces unit, was severely wounded in both legs by a mortar round while trying to reach the communications shack and call for help. His second in command, Lieutenant Charles O . Williams, USA, located a small PRC-10 radio which was still workable and radioed Saigon for help. He then proceeded to organize the defense of the compound as best he could. At approximately 0100 a flare-dropping aircraft arrived to illuminate the area for the defenders; and 45 minutes later armed helicopters began bombing and strafing north and west of the camp.

At approximately 0245 the Viet Cong, supported by artillery, rockets, machine guns and small arms, and using grenades and flame throwers, assaulted the northeast area of the “L”-shaped camp. During this assault, LTJG Peterlin exposed himself to enemy fire and at close range shot a Viet Cong armed with a flame thrower. The gallant defense was, however, to no avail. Greatly outnumbering the defenders, the enemy overran their positions. CMA3 Marvin G. Shields, USN, and UTP2 Lawrence W. Eyman, USN, successfully withdrew to the southeast area of the compound and joined the rest of the U.S. personnel there.

LTJG Peterlin, SWF2 William C. Hoover, USN, and Special Forces Staff Sergeant D. C. Dedman, USA, were cut off from the rest of the defenders and withdrew toward the east side of the camp as the Viet Cong were overrunning the north side. Both Hoover and Dedman had been previously wounded and now LTJG Peterlin was knocked down by an exploding shell and wounded in the right foot by a bullet.All three attempted to crawl through the concertina wire

on the east side of the camp and in the process Peterlin became separated from the other two men. Both were later found dead. Despite intense enemy fire, Peterlin managed to escape the camp, taking refuge in a foxhole several hundred feet away.LTJG Peterlin remained in the foxhole for rest of the night, and throughout the next day and night while Viet Cong on all sides of him fired on U.S. and Vietnamese aircraft attacking their positions. After the Viet Cong withdrew, LTJG Peterlin was helped to a helicopter by a Vietnamese soldier and rescued.

LTJG Peterlin's second in command had an equally harrowing time. EOC Johnny McCully, USN, the team's chief petty officer had also fought on the north berm alongside CIDG soldiers, manning both a machine gun and recoilless rifle. Although wounded by shrapnel and a machine gun bullet, McCully kept fighting until the Viet Cong overran the position. Then he, like Peterlin, had to withdraw. Accompanied by two Vietnamese soldiers, McCully made his way out of the compound and through the village of Dong Xoai. He took refuge in a small sawmill until the morning of 11 June when the Viet Cong withdrew and he was able to join LTJG Peterlin at the rescue helicopter.

At about the same time that Peterlin and McCully were successfully escaping from the northeast area, the remaining American and Vietnamese defenders were barricading themselves in the District Headquarters building in the southeast area. The Viet Cong had originally directed their main effort at this area, making an intense attack against it at approximately 0300 hours on 9 June. Shields and Eyman had already arrived, helping to carry in the wounded Captain Stokes. The remaining Vietnamese defenders, five Special Forces men, and the five Seabees of Seabee Team 1104 still in action valiantly defended themselves against the attacking Viet Cong. The defenders fought on till dawn against the attacking communist troops, while air attacks against the enemy continued. The Seabees distinguished themselves repeatedly, especially Marvin Shields, who although wounded several times continued to fight. Before the battle ended all of the American personnel involved, with only one exception, were wounded, some repeatedly. Shields was finally mortally wounded while helping Lieutenant Williams knock out an enemy machine gun with a rocket launcher.

Early in the afternoon of 10 June, after hearing that a 200-man Vietnamese force sent to their aid had been wiped out, the surviving Americans withdrew to a lOSmm gun pit near the District Headquarters building to make their last stand. They were informed by radio that another relief force, this time a battalion of Vietnamese Rangers, was on the way and that they, the defenders, would be helicoptered out after the relief force cleared the area. The helicopters, however, did not come and with their ammunition almost gone the Americans awaited the final Viet Cong assault. However, before the attack was launched, another air strike hit the Viet Cong and the embattled Americans finally heard the sound of approaching helicopters.

While the Vietnamese Rangers held the enemy at bay, the helicopters landed and rescued the surviving defenders. The helicopters, however, came too late for Marvin Shields who died of his wounds while being evacuated.

The ordeal of LTJG Peterlin and EOC McCulley continued for yet another day; however, they successfully evaded the enemy until until picked up by a rescue helicopter at approximately 0730 on 11 June. The battle of Dong Xoai was over. Of the nine members of Seabee Team 1104 present, two were killed in action and six were wounded. All acquitted themselves in the very best tradition of the U.S. Navy.

CMA3 Marvin G. Shields, USN, was posthumously awarded the Congressional of Honor for his courageous actions on 9 and 10 June 1965. He became the first Seabee to win the nation's

highest decoration. LTJG Frank A. Peteilin and EOC Johnny McCully were awarded the Silver Star. SWF2 William C. Hoover, USN, was posthumously awarded the Bronze Star Medal with Combat “V”. The remaining five Seabees also received the Bronze Star with Combat “V” and the entire Seabee team received the Navy Unit Commendation.

In what was then still a little known part of the world, LTJG Peterlin and his Seabees fought bravely side by side with the Army's finest, suffered wounds and deaths, and acquitted themselves proudly.

VIETNAM:
THE CIVIL ENGINEER CORPS PUTS THE CONSTRUCTION IN!

In terms of Civil Engineer Corps and Seabee participation in Vietnam, Seabee Team 1104 only fired some of the first shots in what was to be a protracted war. The Civil Engineer Corps and the Seabees became deeply involved in Vietnam and other countries of Southeast Asia as the conflict rapidly escalated during the second half of the 1960s.

The Bureau of Yards and Docks (redesignated the Naval Facilities Engineering Command on 1 May 1966) played a major role in the Vietnam War. One reason for this was a Defense Department memorandum of 27 February 1956 which assigned the Navy total responsibility for all defense construction in Thailand, Cambodia, Laos, Vietnam, and the Philippines. As a result, in 1962 the Bureau of Yards and Docks was designated the sole construction agent for contract construction in Southeast Asia. In addition to its own Navy construction, the Bureau was responsible for that of the Army and Air Force as well.

In the early 1960s Officer in Charge of Construction offices were opened in Thailand and Vietnam and the first program, involving the construction of military airfields, began. The initial construction was done by contractors under the auspices of the Military Assistance Program and was for Vietnamese armed forces facilities. During 1964 the construction rate averaged $1 million per month. The following year saw a dramatic increase in U.S. participation in the war which led to an increase in the construction of facilities to support the combatants in the widening conflict. Adequate infrastructure and communications facilities were lacking in Vietnam. However, the monsoons and other climatic extremes, and the long lead times necessary for the procurement of equipment and materials made construction very difficult in Vietnam.

A large contractor consortium, RMK-BRJ, and many smaller contractors, working under fixed price, cost plus fixed fee, and finally cost plus award fee contracts, carried out most of the construction for the U.S. and Vietnamese armed forces. The tremendous increase in construction requirements that began in 1965 caused major management problems which led to the development of a management tool known as Level of Effort. Under the Level of Effort system, a work effort was mounted which at its peak involved 50,000 men, $150 million of equipment, and $200 million of material.

Between 1962 and 1972, RMK-BRJ built 15 jet-capable airfields (8 of which became major bases), and numerous smaller airstrips, 7 deep-draft ports, hundreds of lesser ports, thousands of feet of small craft berthing facilities, more than 3 million barrels of petroleum, oil and lubricant storage facilities, cantonments for more than 350,000 troops, hospitals with a total capacity of 8,000 beds, 56 million square feet of covered and opened storage areas, 2.5 million cubic feet of cold storage areas, over 1,000 kilometers of improved streets, roads and highways, 8,300 lineal meters of new bridges, and over fifty miles of railroad lines. During the lifetime of the single massive construction contract, $1.9 billion of work was completed. The Naval Facilities Engineering Command finally closed out the contract in July 1972, only three months before it closed down the office of the Officer in Charge of Construction, Vietnam. .It was through the unceasing labor of dedicated Civil Engineer Corps officers that this huge construction effort was carried out. Still, to this day, it represents a prodigious achievement.

As we saw at Dong Xoai, Civil Engineer Corps officers were present in Southeast Asia in other than a contract management capacity. Although most of the construction in Vietnam was done by civilian contractors, a significant portion was done by military engineer force personnel.

Although the volume of work was less great, the conditions under which it was accomplished and its importance make the military construction effort noteworthy. These construction units comprised Marine, Army, and Air Force engineer units, and, of course, the Navy's Seabees.

The Seabees were among the earliest military engineers involved in Vietnam. They built refugee camps in the 1950s and sent in Seabee Teams, like the ill-fated 1104, in the early 1960s. In 1965 the steadily increasing insurgency of the Viet Cong made the large-scale commitment of U.S. troops a necessity, if the Republic of Vietnam were to survive. Although Seabee teams had been active in Vietnam since 1963, it was only in 1965 that battalion-size units arrived. The first Seabee battalion arrived in Vietnam on 7 May 1965 to build an expeditionary airfield for the Marines at Chu Lai. Others quickly followed. The Naval Construction Force rapidly expanded from 10 under-strength battalions to 21 full-strength battalions. During the war, the total Seabee community grew from 9,400 in mid-1965 to more than 25,000 in 1968 and 1969. Seabee strength in Vietnam peaked in 1968 when there were 12 battalions in country, organized in two regiments and one brigade. The Seabees were concentrated in the north where most of the hostilities were taking place. All the battalions had their headquarters and most of their personnel in the north; and nearly half the battalions were located in the northern part of the I Corps Area, near the border with North Vietnam.

Seabee accomplishments in Vietnam were impressive; they built roads, airfields, cantonments, hospitals, storage facilities, bunkers, and other facilities critically needed to support the combatant forces. The mobile "search and destroy" strategy adopted by the U.S. during the first years of the conflict shaped the twofold mission of the Seabees: Seabee Teams and detachments built facilities in remote locations while whole battalions built large coastal strongholds in the I Corps Tactical Zone.

Important to the effectiveness of the Seabee operations in Vietnam was the harmonious relationship, based upon mutual respect, that existed between Seabees and Marines. This relationship continued a World War II tradition and was extremely important because the Seabees in Vietnam carried on much of their construction effort in direct support of Marine combat forces.

Seabee strength in Vietnam peaked at around 12,000 shortly after the beginning of the Tet Offensive. While continuing to labor in the north, building city-like cantonments and upgrading previously-built facilities, the Seabees more and more turned their efforts to the south. After responsibility for conducting the war was turned over to the South Vietnamese, U.S. military operations in the north were significantly reduced and the Seabees began working to prepare the South Vietnamese for the ultimate withdrawal of all U.S. forces.

In 1970 Seabee involvement in Vietnam drew to a close and the withdrawal of the remaining units began. The Seabees had made a lasting contribution to the people of South Vietnam. In a war where winning the hearts and minds of the people was an important part of the total effort, Seabees construction skills and medical assistance proved powerful weapons in the "civic action" war. The recitation of events and quoting of statistics fail to reveal the true nature of the Seabees' contribution during the Vietnam war years. While it is true they supported the Marines at Chu Lai, Khe Sanh and Hue, and struggled with the logistics problems of the Mekong Delta, it is also true that the Seabees built roads to provide access to markets, supplied fresh water to countless villages and towns, provided medical treatment to thousands of villagers, and opened new opportunities and hope through Seabee-built schools, hospitals, utility systems, and other community-support facilities. In Vietnam, Seabees worked alongside the Vietnamese and taught

them construction skills, helping them to help themselves and proving that the Seabees were really "builders for peace."

THE GHOST BATTALION

In addition to the regular Seabee battalions that served in Vietnam there was one other rather ephemeral unit, aptly known as the “Ghost Battalion,” whose personnel proudly flew the Jolly Roger as their flag.

During the summer of 1967 an urgent need for an airfield at Quang Tri materialized because North Vietnamese guns were within range of the airstrip at Dong Ha and were routinely subjecting the facilities there to heavy bombardment. It was decided to construct a new airfield just north of the city of Quang Tri, 10 miles south of Dong Ha and outside the range of North Vietnamese guns. The airfield was to be 3,500 feet long and capable of handling C-130 transport planes. A 90,000 square yard helicopter pad and a cantonment for 500 men were also planned. The project was top secret and the location was simply identified as site “X.” This was a top-priority mission with a lot of high-level interest. The Navy was tasked with completing the assignment in no more than 45 days and it naturally fell to the Seabees to see that this was done. No single battalion, however, would be assigned to the project. Instead Quang Tri construction was placed under the operational control of the 32nd Naval Construction Regiment and detachments of officers, men, and equipment from Naval Mobile Construction Battalions (NMCBs) 1, 3, 4, 7, 10, 11, 74, 121, and 133 worked together to carry out the project. CDR Richard L. Foley, CEC, USN, the Commanding Officer of NMCB-3, was designated the Officer in Charge of Construction and LCDR William N. Ahrens, CEC, USN, the Executive Officer of NMCB-121, served as Assistant Officer in Charge of Construction.

When the first detachments gathered together at site “X” on 15 September 1967, they dubbed themselves the "Ghost Battalion" and shortly thereafter began flying as their ensign a black flag with a white skull and crossbones and the words “Ghost Battalion.” When the "Ghost Battalion" Seabees arrived, site “X” consisted only of open meadows. This, however, soon changed; work commenced immediately even though driving monsoon rains lashed the area. By 17 September the Seabees had 90 percent of the temporary helicopter pad finished and the first helicopters landed, one of which carried CAPT James M. Hill, Jr., CEC, USN, the commander of the 32nd Regiment.

A major problem was the necessity to remove 11,000 graves from the airfield site. Two U.S. Army and one Royal Australian Army officer were flown in to assist with the problem. The grave removal effort involved the use of hundreds of Vietnamese laborers and only one week was allowed for it.

Two days after project start-up, the Seabees had already cleared 2,500 feet of airstrip, located the main drainage, and began cutting ditches and installing culverts. It was about this time that the “Skull and Crossbones” flag was first run up. The galley was laid out and barrack construction also began. Despite the rain and having only C-rations to eat, the Seabees remained in high spirits.

The Seabees' efforts did not go unopposed by the North Vietnamese and Viet Cong. Snipers began firing as soon as the Seabees arrived and the Marines that were sent along to provide security were kept busy. By 22 September cement began arriving in quantity and the first 2,500 feet of the runway was nearly to finish grade. Soil cementing could commence as soon as Pulva-mixers, piping, and pumps arrived.

On 23 September General Westmoreland dropped in for a visit, an indication of the high priority placed on the new air facility. On the following day the first 1,000 feet of runway was ready for

soil cementing and 50 percent of the permanent helicopter pad was cleared. On the next day a mortar tower was delivered by a flying-crane helicopter. The Viet Cong hit site “X” that night with a mortar attack, probably because they saw what the crane helicopter was delivering. Site “X” received between fifty and sixty 60 mm and 81 mm mortar rounds. Ten Marines were wounded; however, there were no Seabee casualties. The mortar tower was erected the following day.

By 27 September the base was beginning to take shape and the enemy, obviously concerned, made a second mortar attack.The thirty incoming rounds hit around the messing area wounding 30 Marines and 2 Seabees. By this point the runway had been graded and soil cementing began the next day. Construction continued on the new base until, by 20 October, the whole 3,500 foot runway was complete. One-third of the taxiway and one-half of the parking apron, however, remained to be completed.

On 23 October the first C-130 transport landed on the field and the pilot reported that the runway was the smoothest expeditionary runway he had ever landed on. Finally, on 30 October the helicopter pad was completed and Squadron HMM 163 landed in full strength. The mission was completed in 38 days, 9 days earlier than scheduled, and the men of the "Ghost Battalion" returned to their parent units. Future construction at site "X" became the responsibility of NMCB-10.

The airfield at Quang Tri was later expanded into a much larger installation and three years later was used by the South Vietnamese armed forces as the principal staging area for attacking North Vietnamese forces along the Ho Chi Minh Trail.

REINDEER STATION
THE CIVIL ENGINEER CORPS AND SEABEES ON DIEGO GARCIA

One of the major projects for the Naval Facilities Engineering Command and the major project for the Seabees in the 1970s and early 1980s was the construction of naval facilities on the atoll of Diego Garcia, which was part of the British Indian Ocean Territory. Diego Garcia, one of the 52 coral atolls of the Chagos Archipelago, was located in the Indian Ocean 960 miles south of India and 7 miles south of the equator. The 6,700 acre, heavily vegetated atoll was horseshoe-shaped with a perimeter of approximately 40 miles and average elevations of 3 to 7 feet. The annual rainfall was approximately 100 inches.

On 24 October 1972 the U.S. and British governments signed an agreement concerning the construction of a U.S. Naval Communication Station on Diego Garcia. The purpose of the facility was to provide a necessary link in the U.S. defense communications network and furnish improved communications support in the Indian Ocean for ships and aircraft of both governments. The U.S. was to build the facility using Naval Construction Force personnel.

The Diego Garcia base was initially planned as an austere communication station with all necessary supporting facilities, including an airstrip. On 23 January 1971 a nine-man reconnaissance party from Naval Mobile Construction Battalion (NMCB) 40 landed on the atoll to confirm planning information and carry out a preliminary survey of the beach landing areas. In early March a 50-man party from the same battalion and from Amphibious Construction Battalion 2 as well as other specialist personnel arrived by LST, and was followed by an advance party of 160 men from NMCB-40. These men were to construct a temporary Seabee camp, water and electrical distribution systems, a dining hall, laundry, refrigeration and storage facilities. Finally, they were to build an interim 3,500-foot airstrip.

In October and November, Detachment “CHAGOS” of NMCB-71 and the whole of NMCB-1 arrived, marking the beginning of large-scale construction. NMCB-1 built the transmitter and receiver buildings and placed the base course for the permanent runway and parking apron. In July 1972 NMCB-62 relieved NMCB-1 and took over the departing battalion's projects. On 25 December the first C-141J transport landed on the newly completed 6,000 foot runway with the Bob Hope Christmas Troupe. The full 8,000 foot permanent runway with adjoining taxiway and parking apron was completed by March 1973; and on 20 March, exactly two years after construction began, the U.S. Naval Communication Station, Diego Garcia, was officially established.

Work commenced on the second construction increment, a $6.1 million project, which involved the construction of a ship channel and turning basin in the lagoon. This project, however, was contracted to a Taiwanese firm. The Seabees continued to work on support and personnel facilities in the cantonment area at the northern tip of the atoll. The second major area of construction was the airfield and its supporting facilities. Revised requirements called for the extension of the original 8,000-foot runway to 12,000 feet and additions were made to the parking apron and taxiways. New hangars and other support facilities were also built. In addition, construction of extensive petroleum, oil and lubricant storage facilities was initiated. The Navy required 480,.000 barrels of storage to support ship and aircraft needs and the Air Force required an additional 160,000 barrels.

During 1973 and 1974 Seabee units worked on all these projects. Because the final mission of Diego Garcia was still evolving, it was clear that still more construction would take place in the years to come.

In 1975 and 1976 Congress authorized $28.6 million to expand the Diego Garcia facilities to provide minimal logistics support for U.S. task groups operating in the Indian Ocean. This mission expansion called for construction of a fuel pier, airfield expansion, and more petroleum, oil and lubricant storage, and personnel support facilities. Additional projects were undertaken in 1978. Construction was accomplished by both Seabees and private contractor personnel and it was anticipated that the Diego Garcia project would finally be completed in 1980. World events in 1979 and 1980, however, forced a reevaluation of the U.S. defense posture in the Indian Ocean Area which indicated the need for pre-positioned materials to support a rapid deployment force and a more active U.S. presence in the area. It was decided to further expand the facilities at Diego Garcia in order to provide support for several pre-positioned ships, loaded with critical supplies. By the end of 1980 the Naval Facilities Engineering Command had advertised a $100 million contract for initial dredging at Diego Garcia to expand the berthing facilities.

In the early 1980s the construction effort at Diego Garcia rapidly shifted from Seabees to private contractors. The last full Seabee battalion, NMCB-62, departed the atoll in July 1982. While Seabees remained in detachments, contractor personnel took over the projects yet to be accomplished on Diego Garcia. Thus, what began as simply a communication station on a remote atoll became a major fleet and U.S. armed forces support base by the 1980s. Diego Garcia was the major Seabee construction effort of the 1970s and they acquitted themselves well under the difficult and isolated conditions that exist there. When the Seabees arrived they lived in tent camps, when they departed they left a fully-developed, modern military facility, capable of supporting thousands of U.S. personnel.

KILLED IN ACTION IN PEACETIME:
AN OCCUPATIONAL HAZARD OF TODAY'S MILITARY

In the nineteenth century, service in the Civil Engineer Corps entailed no more personal risk than that run by the average civilian. Civil Engineer Corps officers were truly “civil” officers in the sense that their duties were completely noncombatant in nature and did not take them into harm's way. As the twentieth century progressed, and especially after U.S. entry into World War II, this ceased to be the case. As Civil Engineer Corps officers increasingly acquired powers and perquisites hitherto the preserve of the line, they also began to run the same risks as the latter.

Since the outbreak of World War II, 22 Civil Engineer Corps officers and 353 Seabees have been killed in action during wartime. During the last few decades, however, a new peacetime threat has emerged. Various disaffected groups in the world have increasingly made use of terrorism as a weapon. Three Civil Engineer Corps officers and one Seabee are numbered among their victims.

At mid-morning on 13 April 1974 on the northeastern edge of the U.S. Naval Base at Subic Bay in the Philippines, CAPT Thomas J. Mitchell, CEC, USN, Commander of the 30th Naval Construction Regiment, CDR Leland R. Dobler, CEC, USN, Commanding Officer of Naval Mobile Construction Battalion 133, and LT Charles H. Jeffries, CEC, USN, Officer in Charge of Detachment WALLABY of that battalion, were riding in a jeep on an inspection tour of a section of perimeter road which was being worked on by LT Jeffries detachment. The three officers were driving in an isolated area approximately seven miles from base headquarters in deep jungle along the boundary between the base and Bataan Province when unidentified terrorists ambushed them, cutting the three men down in a hail of fire. Seabees from LT Jeffries detachment, who were working about half a mile away, heard the shooting, rushed to the ambush scene, and notified base headquarters. A CH-46 medical evacuation helicopter with a doctor aboard flew to the scene while an ambulance covered the distance on the ground; however, to no avail, as the three officers were dead. U.S. Marines and Philippine Constables immediately moved into area to locate the attackers, but they were unsuccessful and the attackers were never positively identified. To this day, the three Civil Engineer Corps officers remain the victims of anonymous terrorists.

The three officers were typical of their generation and rank. CAPT Mitchell, a 1953 graduate of the Naval Academy, after a tour aboard the USS KNAPP went to Rensselaer Polytechnic Institute and transferred to the Civil Engineer Corps. He subsequently served in the usual junior officer billets, including a tour as Aide and Special Assistant to RADM Eugene J. Peltier, CEC, USN, Chief of the Bureau of Yards and Docks from 1957 to 1962. Mitchell went on to become the first Civil Engineer Corps officer to graduate from the advanced nuclear power course at the Submarine School, New London, Connecticut; and became the first Officer in Charge of the PM-3A nuclear power plant at McMurdo Sound in Antarctica. Other assignments followed, including that of Executive Officer and Operations Officer of the Public Works Center, Pearl Harbor, before he received his fateful assignment as Commander, 30th Naval Construction Regiment.

CDR Dobler began his Navy career after graduating from the University of Nebraska; and also held the usual Civil Engineer Corps assignments. For his accomplishments as Assistant Public Works Officer at the Naval Station, Kodiak, Alaska, following the disastrous 1964 Alaskan earthquake, he was awarded the Secretary of the Navy's Commendation for Achievement.

LT Jeffries, a graduate of the Naval Academy, transferred to the Civil Engineer Corps after receiving his B.S. and M.S. degrees in civil engineering at Purdue University. Following two tours of duty in the U.S., he reported to Naval Mobile Construction Battalion 133 as a company commander. He was subsequently made Officer in Charge of Detachment WALLABY, the position he held at the time of his death.

All three officers, two senior and one junior, had already accomplished much during their years in the service, and undoubtedly would have accomplished a great deal more had they lived. All three men left wives and children behind them, the legacy of a single, brutal terrorist act.

SW2(DV) Robert D. Stethem, USN, suffered the same fate as Mitchell, Dobler, and Jeffries -- death at the hands of terrorists. Stethem joined the Navy in December 1980 and after recruit training became a Seabee with Naval Mobile Construction Battalion 62; he served with that unit until 1984. After additional training, Stethem became a diver with Underwater Construction Team 1, based at Norfolk, Virginia, in September 1984.

On 15 June 1985, following completion of a routine repair project at a base in Greece, Stethem and four other members of his unit were returning to the U.S. aboard TWA Flight 847 when Shiite Muslim terrorists hijacked the flight and diverted it to Beirut, Lebanon. The terrorists singled out Stethem and another Seabees for physical abuse. While the aircraft sat at the Beirut airport, the terrorists savagely beat Stethem over a prolonged period, and finally killed him with a bullet to the head. They then callously dumped his battered body out of the plane onto the tarmac. A stewardess later testified that SW2 Stethem "was a very courageous man. He never made a sound' while being beaten. After lengthy negotiations over a period of two weeks, the remaining passengers were first turned over to the Shiite Amal organization and finally freed. The four original terrorists made good their escape into Beirut.

The hijackers were later identified, and one of their number, Muhammad Ali Hamadi, was arrested in West Germany in the midst of another terrorist plot. Identified as the terrorist who killed Stethem, Hamadi was tried and convicted of air piracy and murder. Hamadi was spared Stethem's fate and showed mercy where he showed none for Germany has no death penalty. He is currently serving a life sentence in a West German prison

Thus, CAPT Mitchell, CDR Dobler, LT Jeffries, and SW2 Stethem all gave their lives in peacetime, victims of terrorism.

CONCLUSION

Across almost the years Civil Engineer Corps officers have developed themselves into an elite profession within the Navy, performing critically-needed engineering functions without which the Navy's shore establishment would not exist in its present form. Without an effective shore establishment, the U.S. Fleet could not perform its function of defeating the enemy at sea; and throughout their corps' history, Civil Engineer Corps officers have always been there to provide that shore establishment so vital to the fighting ability of the fleet. Without port facilities, dry docks, barracks, training and storage facilities, the operational forces of the Navy could not have been effective in any period of U.S. history. This is the great triumph of the Civil Engineer Corps to provide prosaic, non-dramatic facilities essential to fleet support -- and vital to victory at sea.

As we have seen, a new dimension was added at the beginning of World War II, when Civil Engineer Corps officers became troop commanders and full combatants. But whether, they serve as contract managers at one of the subordinate activities of the Naval Facilities Engineering Command or as officers of a fleet-operational Seabee battalion, their primary mission is to provide and maintain facilities in support of the Fleet and this they have never ceased to do since the first five of their numbers were given the Presidential commission as officers in the U.S. Navy.

There can be no real “conclusion” to the history of the Civil Engineer Corps because Civil Engineer Corps officers as administrators, contract managers, and Seabee officers continue down to the present day to perform their duties in an exemplary manner, producing the substance of further historical vignettes.