Chapter One

THE CORPS OF ENGINEERS IN ALASKA, 1869-1946

On 16 June 1775, Gen. George Washington selected Col. Richard Gridley to serve as the Chief of Engineers for the Continental Army, then laying siege to the City of Boston. This appointment is usually regarded as the formal foundation of military engineering in the United States Army. Two years later, the Continental Congress established the first Corps of Engineers, an organization disbanded at the end of the war in 1783 and later reconstituted in 1802. From that period, the Corps of Engineers has been responsible for a wide range of activities in support of the combat forces employed by the United States. But its place in American history has not been restricted to military missions. From the General Survey Act of 1824 down to the present, the Corps has contributed to an increasing variety of civil works ranging from exploration and surveying to the building of harbors, canals, and roads, as well as comprehensive water resources management.

The history of the Corps in Alaska has closely paralleled the general history of the development of the region, a history that has passed through at least three major phases and now appears to be embarked on a fourth. Early Alaska, down to the arrival and settlement of the Russians, was chiefly characterized by a native subsistence economy. The fur-sealing activities of the Russians were but the initial phase of a period in which extractive industries of a limited sort grew up in the Alaskan economy. In addition to fur-sealing there appeared, especially from the middle 1890's, fishing, lumbering, and above all mining for gold, copper, and coal. The new economic activity and the accompanying population growth generated a need for expanded transportation facilities and provided the initial stimulus for Corps civil works activities in the territory.

The tremendous expansion of military activity in Alaska during World War II considerably changed the nature of Alaskan economy and society. One scholar has gone so far as to label the period from 1940 to 1959 as "Military Alaska." [1] The mobilization of large military forces in World War II and the subsequent strategic importance of Alaska as a forward warning post in the Cold War era not only substantially increased the work of the Corps in Alaska but for a considerable time altered its emphasis away from civil works to the direct support of military activities.

In time the mission of the Corps changed again. By the late 1950's and early 1960's the building of military facilities in Alaska was more or less completed and the Corps' efforts in civil works again came to the front. As it developed, the Corps' civil mission came to have three dimensions--the maintenance of works previously laid down, the revival and completion of projects advocated or initiated before the onset of the war, and the comprehensive review of all Alaskan water resources with a view to flood control and the development of hydroelectric power.

The renewed emphasis on civil works was accompanied and stimulated by new developments in the Alaskan economy, chiefly the growth of the services industries and the population expansion associated with that. By the early 1970's, still another element had been injected--the development of a large scale petroleum industry. Having largely completed its early navigation projects and its major construction projects for the military, the Corps is now faced with such new and diverse tasks as planning in support of urban development, watershed management for large urban populations (especially in the Anchorage area), and the generation of hydroelectric power.

If the mission of the Engineers has undergone considerable change in the last seventy years, so also has the organization of the Corps. At the time of Alaska's purchase from the Russians, all Engineer activity in the west and northwest (apart from individual offi-

Hq. Military District of Alaska, in Sitka about 1868.

cers attached to field commands) was under the control of a District headquarters in San Francisco. In 1871, this large district was split and a second headquarters created at Portland. Then, in its turn, the Portland Engineer District was divided and a third District headquarters established at Seattle (1896).[2] The Seattle District was responsible for Corps civil works in Alaska down to 1921 when the Juneau District was created. This experiment in Alaskan-based administration came to an end in 1932 when the Seattle District resumed its former Alaskan responsibilities. In 1939, Seattle again took a step toward local administration when it established an Area Office in Anchorage.

The sudden and large demands of World War II produced a variety of organization expedients and arrangements in Alaska. The general effect of the demands of mobilization in Alaska accelerated the trend back toward locally based administration. After going through a number of interim structures, by the end of 1943 the Alaska Defense Command (later the Alaskan Department) had assumed control over all military construction in Alaska. At the end of the war, the enlarged military presence in the region and the prospect of new military assignments for the Engineers led to the creation of the Alaska District.

In addition to their service under Corps of Engineer organizations, Engineer officers have undertaken tasks in Alaska under the direction of other authorities ranging from department and field commands to special commissions created for Federal administration in Alaska before it became a state. For example, Engineers worked for the Board of Road Commissioners for Alaska (commonly referred to as the Alaska Road Commission) created in 1905 to improve land communications in the region, especially the pack trail and wagon road running from Valdez in the south to Eagle in the interior. As Congress placed this body under the War Department, Engineer officers not only worked for it but occasionally presided over it. In the period from 1905 to 1909, Rivers and Harbors work in Alaska fell under the jurisdiction of the ARC. A significant testimony to Engineer service with the ARC, and their contribution to road building in Alaska in general, is the fact that three of Alaska's modern highways are named after Engineer officers--Maj. Wilds P. Richardson, Col. J.G. Steese, and Maj. Malcolm S. Elliott. Beyond service for the ARC, Engineer officers were also involved in the construction of the Alaska Railroad (completed in 1923) under the jurisdiction of the Alaska Engineering Commission.[3]

No account of organized human activity in Alaska can ignore the difficulties presented by the Alaskan environment. This is especially true in the case of the Corps of Engineers. Engineering in Alaska has had to contend with a harsh, difficult, and extremely varied climate. The word "Alaska" almost always produces an initial image of severe cold, snow, and ice, but in reality there are a number of distinctly different climatic regions in Alaska

Brig. Gen. Wilds P. Richardson

and each presents particular difficulties for engineering and construction.

Southeastern or Panhandle Alaska consists of islands and a narrow and extremely rugged coastal strip bordering Canada. The area experiences a comparatively mild and wet climate rather like that of Washington state. The topography stands in the way of any land route north from Ketchikan so the entire area depends on aircraft and waterborne transport. The offshore islands do provide sufficient cover from the Pacific Ocean for the existence of a sheltered water route from Seattle to Skagway commonly referred to as the "Inside Passage."

Southcentral Alaska curves westward from the northern edge of the Panhandle to the tip of the Alaskan Peninsula. The Alaska Range partially shields this region from the severities of the Arctic air masses but it also unfortunately stands in the way of easy land communications with the interior.

Southwestern Alaska presents still more difficult topography. The Alaska Peninsula is marked by numberless lakes, bays, coves, inlets, and volcanoes. From the Peninsula, the Aleutian Chain spreads westward toward Asia, a line of barren islands, subject to the most violent types of weather and possessing very few safe harbors.

The Alaskan interior consists largely of rolling uplands bounded on the south by the Alaska Range and on the north by the Brooks Range. It extends from the Canadian border nearly to the Bering Sea and is traversed by the endlessly meandering Yukon River. It is in this region that the greatest seasonal range of temperatures occurs. In winter, the temperature may fall to as low as -80 degrees (F.) and in summer, it may rise to as much as 90 degrees (F.) above zero.

Western Alaska is made up of that region of muskeg-covered lowland lying between the interior and the Bering Sea. The area is sprinkled with thousands of lakes and ponds and it receives the full effects of the bitter wind and winter storms from the Bering Sea.

Finally, there is the Arctic Region, extending north from the Brooks Range up to the Arctic Ocean. It is a vast monotonous plain swept by persistent wind. The coastline is bound by ice for most of the year and the permafrost mantle in the region is said to reach depths of 2,000 feet.

The Alaskan environment imposes a multitude of severe difficulties on engineering activity. To begin with, Alaska's separation from the continental United States (and from major Canadian economic centers as well) has imposed large and often prohibitive costs on the movement of goods to the region. To put it simply, this isolation, more than any other factor, has historically made large scale construction extremely expensive.

The problem of distance is made worse by topography. Until the construction of the ALCAN (now Alaska) Highway in 1942, there was no land connection with the "lower 48." The rugged coastline prohibits the development of roads in that area. Sea communication is protected by the Inside Passage, but north and west from the Passage, vessels must cross the treacherous Gulf of Alaska. If they wish to travel further north they must contend with the twin hazards of weather and ice.

With the exception of the Panhandle, the Alaskan construction season is severely limited by snow and ice that comes too early and leaves too late. This problem works to increase costs and often forces projects to endure over long periods; occasionally it generates pressures also to do work too hastily.

Communications difficulties and seasonal limitations are not the sum of construction difficulties in Alaska. Muskeg is a heavy moss found in bogs, sometimes to a depth of fifteen to twenty feet. Once the surface of this spongy matter is broken it cannot support any weight and becomes simply impossible as a foundation for buildings, roads, and airfields. Where permanent facilities are needed, it must be stripped away and a firmer foundation provided.

Ordinary frost in Alaska produces the usual heaves familiar to anyone living in the northern region of the United States. It is permafrost that presents relatively unique problems. It is hard and it can break drills and piles, but the most common difficulties arise from the disturbance of the ground over permafrost by construction activity. This usually affects the delicate balance between freezing and thawing, creating in time very difficult problems of heaving and subsidence that can reduce buildings and roads to shambles. [4]

In short, taken together, climate, terrain, permafrost, muskeg, and relative isolation from the "Outside" have historically posed a range of problems for engineers encountered in no other area of the United States and its possessions.

The earliest activities of Engineer officers in Alaska were largely in the form of exploration. Capt. Charles W.

Raymond is usually regarded as the first Engineer officer to carry out an important mission in the region. Raymond, who ranked first in his West Point class of 1865, was given his first independent duty in 1869 barely two years after the purchase of Alaska from the Russians. He was ordered to explore the Yukon River from its mouth to Fort Yukon with the principal object of determining whether the Hudson's Bay Company post located there was in American territory.[5]

Lt. Col. Charles W. Raymond, CE, 1900.

Raymond left San Francisco on 6 April 1869 on the brig, *Commodore*. This ship carried on its deck a small 50 foot sternwheel boat appropriately named *Yukon*. The steamer belonged to the Alaska Commercial Company and was to be used to service agents of the Company on the Yukon River. On 29 June, Raymond arrived at Saint Michael, the old Russian outpost on Norton Sound; the following day the Yukon was launched and made ready for the journey upriver. With two barges in tow, Raymond and his party made for the Apoon mouth of the Yukon. A month later, after travelling just over 1,000 miles, the party arrived at Fort Yukon where after a week's delay a solar eclipse allowed Raymond to make longitudinal calculations showing the Bay Company's post to be well inside American territory. Raymond ordered the Company to vacate the post and cease doing business downstream further into Alaska. On 9 August, he raised the American flag and formally took possession of the post.

As the *Yukon* was to be used for A.C. Company purposes, Raymond and his assistants had to find another means to return to Saint Michael. They built a small skiff from spruce drift logs, caulked it with rags, and coated it with pitch. With this makeshift arrangement they made their way slowly down the river suffering many hardships enroute. On 27 September, they departed from St. Michael in a more conventional and comfortable craft, their assignment completed.

Captain Raymond was not the first explorer of the Yukon region; he did not provide the first accounts of the people, flora, and fauna of the area along the river. But he did produce a map and a chart of the river that were

clearly superior to older ones and his recorded observations were a substantial contribution to the corpus of material on the region.[6]

Between August and October 1896, another Engineer officer, Capt. David Dubose Gaillard, carried out an examination of the Portland Canal, the waterway which forms part of the border between southeastern Alaska and Canada. Gaillard's report contains a detailed description of the Canal including the observation that at that time there were no inhabitants on the Alaskan side. During the course of the exploration, Gaillard and his men built four storehouses along the canal, which he believed to have been the first masonry buildings erected in Alaska.[7]

In the 1890's the Army's responsibilities were greatly enlarged by the influx of prospectors into the region. By 1904, the Army had established posts at Rampart City, Circle City, Fort Gibbon (near Tanana), and Fort Egbert (at Eagle) in the north. In the west there were posts at Fort Saint Michael and Nome. And of course, troops were maintained at Haines (Fort Seward) and Valdez (Fort Liscum) in addition to the re-established Fort Wrangell.

The problem of communication between these posts led first to the development of a telegraph system by the Army. In 1900, the Army Signal Corps completed a 25 mile line from Nome to Port Safety. Four years later the Signal Corps had finished what came to be known as WAMCATS (Washington-Alaska Military Cable and Telegraph System), a network binding together all the interior posts and providing them with communication to the "Outside," Seattle in this case.

The problems of communication also led to the survey and development of a land route from the south to the interior on the Yukon. Captain W.R. Abercrombie, who had been involved previously in Alaskan exploration, laid out a trail between Fort Liscum at Valdez and Fort Egbert at Eagle on the Yukon. In 1904, Capt. Wilds P. Richardson laid out a trail from this military road to the mining settlement at Fairbanks. These trails ultimately became the Richardson and Taylor Highways.[8]

Pressure to develop land communications was not the only result of the gold rush. The flood of gold seekers and the quickening of economic activity associated with the rush placed great stress on the facilities for communication by sea. The Corps of Engineers undertook its first responsibilities as an institution in Alaska in direct response to this problem. The first civil works assignment carried out by the Corps in Alaska was an examination and survey of navigation conditions in Wrangell Narrows in 1902-3.

The report of the survey reveals the makeshift arrangements the Corps was forced to operate under in Alaska in these early years. In fact, the Seattle District did not initially submit a survey done by its own officers but instead relied on the testimony of sever-

al ship's officers who had experienced difficulty in navigating the Narrows.

In 1903, however, the Seattle District dispatched a survey and evaluation team of its own to the area. They reported the Narrows to have insufficient depths for vessels other than small tugs and fishing boats. Larger vessels had to wait for favorable water or detour via Sumner Strait, Christiana Sound, and Chatham Strait, an increased distance of some ninety miles over the Narrows passage. The survey also pointed out the existence of difficult tides and dangerous shoals; it recommended dredging a channel 20 feet deep and 200 feet wide through the passage. Unfortunately, the cost of such a project (the contemporary estimates varied between $1 million and $1.6 million) was prohibitive at the time and Congress did not approve it until the mid-twenties.[9]

The first Engineer project carried through to completion in Alaska was the Saint Michael Canal. In spite of its remote location and the fact that it was blocked by ice eight months out of the year, Saint Michael served as the principal port of entry to the Yukon River trade, a trade that expanded considerably as a consequence of the gold rush. In addition, Saint Michael served as a distribution center for a number of small villages located along the shore of Norton Sound.

In order to facilitate navigation into the Yukon, the Engineers dredged a passageway from a natural channel between the Sound and Saint Michael Bay. This channel became a canal 100 feet wide and 6 feet deep over a length of about six miles. When the project was completed in 1911 it provided a sheltered passageway for riverboats to the Apoon mouth of the Yukon.[10]

In the Yukon Delta there are shoals made up of pillows of silt formed by the river at flood stage and shaped by wind and tides. These shoals were a constant danger and source of frustration when entering the river through the Apoon. In 1910, shippers petitioned Congress for improvements in the Apoon channel. Despite reservations about the cost, the Chief of Engineers finally approved the project. When the work was completed in 1915 (at a cost of $132,000) the Engineers had dredged a channel to a depth of 6 feet and a width of 150 to 200 feet.[11] Unfortunately, the economic value of the Saint Michael Canal and the improvement of the Apoon

declined rapidly in the early twenties when freight traffic for interior Alaska shifted away from the mouth of the Yukon to the newly constructed Alaska Railroad. [12]

The gold rush community of Nome also received attention from the Corps in this early period. Nome was virtually nonexistent in 1895; four years later, following the discovery of gold on Anvil Creek (and later along the shore of Norton Sound), Nome's beaches were crowded with 15,000 or more eager prospectors. Vessels transporting goods and men to this area encountered a fundamental problem--there were no harbor facilities for ocean-going craft. Shallow water extended out some two miles from the shoreline and there was no shelter from the vicious Bering Sea storms. Initially, vessels transferred cargo ashore by the most rudimentary lighter craft, in some cases cargo that would float was simply thrown overboard and left to float ashore.

In 1904, a private company was granted permission to dredge the

Jetties, channel, and turning basin at Nome. Sea wall is at right of harbor entrance.

mouth of the Snake River (on the west edge of Nome) out to the open beach and to protect the resulting channel with jetties. It was expected that tolls would pay for the construction of this rudimentary harbor, but after a year's preliminary work, the company dropped the project.[13]

In 1915, the Engineers examined the community's navigation problem and concluded that the economic benefits from the construction of a harbor would not compensate for the cost involved. A year later, the Chief of Engineers ordered a second investigation. This time the Seattle District proposed dredging a basin in the Snake River to be connected with open water by a 75 foot channel. The Nome City Council agreed to provide space for the disposal of dredged material and to offset the cost of maintenance of the facilities by contributing $2,500 annually toward dredging maintenance.[14]

Completing and maintaining this project has historically proved to be one of the Corps' most expensive efforts of its kind. From the completion of the first phase of the project in 1923, the Corps has been constantly involved in repairing the jetties and revetments as well as dredging. The City of Nome has gained from this long-standing effort one of the best bargains any municipality has ever enjoyed from a Corps civil works project, for it is still supporting the dredging operation at the rate fixed in 1917.

In addition to these projects (and the examination of Wrangell Narrows) the Seattle District undertook surveys of six other sites of potential navigation improvement between 1902 and 1921. These included Katalla Bay (1907), Kuskokwim Bay (1907), Sergius Narrows (1911), the Tolovana River (1916), Controller Bay (1917), and Wrangell Harbor (1920). A considerable expansion of Corps activity in Alaska followed the creation of the Juneau Engineer District in 1921. Between that date and 1932 (when the Corps terminated the Juneau experiment), Congress authorized thirty examinations and surveys; three of these (plus two surveyed earlier) became active projects in this period.[15]

Nineteen of these thirty potential projects were located in southeastern Alaska. The five projects actively begun by the Corps in this period were designed to improve harbors at Wrangell, Port Alexander, Ketchikan, and Seward, and begin the process of clearing the channel in Wrangell Narrows. The harbor projects were fundamentally similar, each involved dredging a channel, a basin, or the construction of breakwaters, or some combination of the three. In addition, the Corps assumed responsibility for a project begun by the Alaska Road Commission--the control of Lowell Creek, a stream near and in Seward, the southern terminus of the Alaska Railroad.[16]

Owing in part to the Depression, there was a significant hiatus in Corps civil works activity from 1931 (shortly before the deactivation of the Juneau District) until 1935 when Alaska bene-

fited from the expansion of public works legislation. Between 1935 and 1940, Congress adopted seven of the Juneau District proposals as projects and authorized a further twenty examinations and surveys. Four of this latter group also became authorized projects in this period. [17]

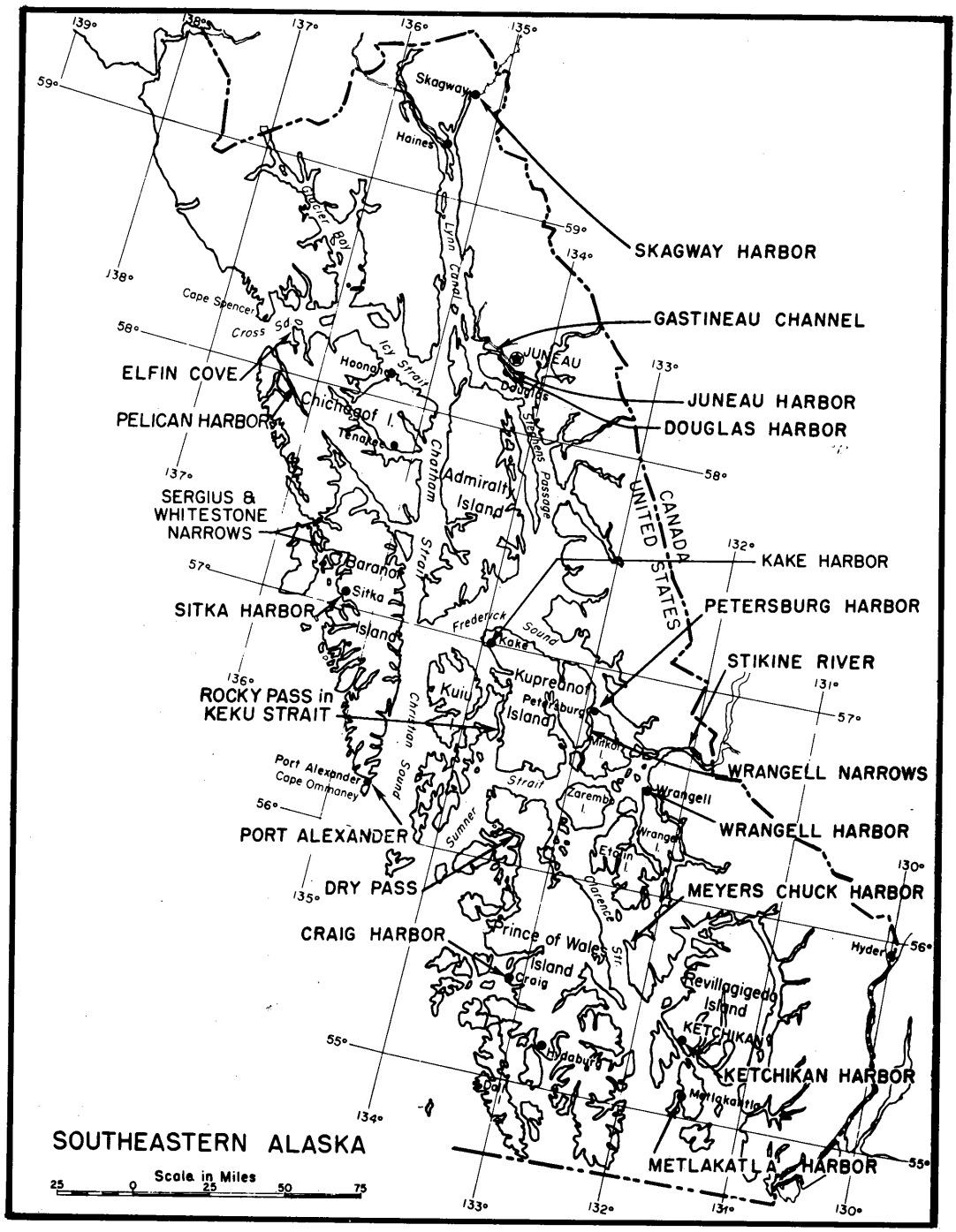
In the thirties, Congress authorized improvements for harbors at Sitka, Cordova, Petersburg, and Kodiak. In addition, it directed the Corps to improve the Egegik River passage (used by fishing boats) from Shelikov Strait to Bristol Bay; to undertake snagging operations in the Stikine River (the major entrance to the Cassier mining district); and to construct a dike to control the overflow of the Salmon River at Hyder.

A general review of the pre-war work of the Corps of Engineers in Alaska reveals one distinctive feature --the concentration on the development of harbors and coastal navigation in the southeast and southcentral regions. This concentration was natural for a number of reasons. By the early 1920's trade with the interior had shifted its port of entry from the mouth of the Yukon to the government railroad at Seward (in addition to Valdez, the port of entry for the Richardson Highway). The greatest concentration of population existed in southeastern Alaska where the fishing and lumbering industries predominated. And finally, before World War II, all movement of goods northward to any point in Alaska used the Inside Passage. Hence, the concentration on coastal navigation and harbors in southeastern and southcentral Alaska was explained by the fact that those areas were most likely to experience economic benefits which would justify the costs of improvement.

WORLD WAR II

The second World War produced several fundamental changes in the Alaskan mission of the Corps of Engineers. For the first time, the Corps took on the burden of all military construction, combat and non-combat. It underwent this expansion of responsibility in the middle of mobilization, a process which greatly multiplied the amount of work in a very short time. Military work also ultimately involved large-scale construction in interior Alaska where the Engineers had to deal with the more severe environmental problems of weather, muskeg, and permafrost. Most of the previously accumulated experience of military engineers in Alaska had been confined to the coastal regions (with the exception of those involved with the Alaska Road Commission and Alaska Engineering Commission). Finally, the volume and complexity of Alaskan work required the establishment of an Alaskan-based administration for military construction, an arrangement that led directly to the creation of the Alaska Engineer District following the war.

By 1938, one year before the outbreak of the European war and three years before the onset of hostilities


SKAGWAY HARBOR
GASTINEAU CHANNEL
JUNEAU HARBOR
DOUGLAS HARBOR
ELFIN COVE
PELICAN HARBOR
SERGIUS & WHITESTONE NARROWS
SITKA HARBOR
ROCKY PASS in KEKU STRAIT
PORT ALEXANDER
DRY PASS
CRAIG HARBOR
KAKE HARBOR
PETERSBURG HARBOR
STIKINE RIVER
WRANGELL NARROWS
WRANGELL HARBOR
MEYERS CHUCK HARBOR
KETCHIKAN HARBOR
METLAKATLA HARBOR
SOUTHEASTERN ALASKA
Scale in Miles
Skagway
Haines
JUNEAU
Douglas
Hoonah
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Chichagof I.
Admiralty Island
Baranof
Sitka
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Kuiu Island
Kupreanof
Petersburg
Wrangell
Mitkof I.
Zarembo I.
Etolin I.
Prince of Wales Island
Craig
Revillagigedo Island
KETCHIKAN
Hydaburg
Metlakatla
Hyder
Port Alexander
Cape Ommaney
Cape Spencer
Icy Strait
Chatham Strait
Lynn Canal
Stephens Passage
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between Japan and the United States, the military presence in Alaska had shrunk so far as to be virtually nonexistent. The early military posts had been established largely to maintain order during the influx of the somewhat unruly miner population in the gold rush. By the middle twenties, this need had vanished for the most part; by 1938, only one of the original army posts remained occupied--Chilkoot Barracks (originally Fort Seward) at Haines. Despite the efforts of Alaskan political figures (and General Billy Mitchell) to convince them to the contrary, the War Department clearly did not believe Alaska to be a vital strategic area requiring a large local defense system. [18]

Throughout the twenties and thirties, American defense policy placed the primary responsibility for the defense of Alaska and the northern approach to the continental U.S. on the Navy. But in 1938 the Navy had no important facility in Alaska either. It had earlier reserved Kiska Island for use as a coaling station, but no establishment was developed there. The Five-Power Treaty of 1922 forbade any fortification of the Aleutians. All the Navy had was a small seaplane base at Sitka and two other direction finder stations. [19]

The government's view of Alaska's military importance began to change in late 1938 with the publication of the Hepburn report. This Navy document urged the establishment of seaplane and submarine bases at Kodiak, and Dutch Harbor in the Aleutians. In June 1939, the Army Air Board recommended the establishment of an air garrison in Alaska. These developments were prompted by worsening relations with Japan, the awareness of increasing Japanese naval strength, and the belief in the strategic danger represented by long-range bombing planes operating from captured Alaskan bases. By late 1939, the Navy had begun work on the bases proposed in the Hepburn Report and the Army had started to construct a cold weather testing and training station at Ladd Field in Fairbanks. [20]

By early 1940, the War Department had developed a comprehensive plan for the development of a military establishment in Alaska. The Department recommended increasing the Alaskan air and ground forces, the establishment of a major base for the Army and Air Corps at Anchorage (in addition to the Fairbanks station), the creation of a system of airfields throughout the Territory protected by local garrisons, and the provision for Army protection of the Navy bases. This fundamental program remained intact throughout the war although there was considerable conflict over priorities and emphasis. [21]

After the initial establishment of an Alaskan garrison, (the Alaskan Defense Force) the local commander, Col. Simon Bolivar Buckner, Jr., urged first the concept of aggressive defense and later proposed the use of bases in the Aleutian chain for an assault upon Japan. Buckner's recommendations aside, the War Depart-

ment was forced into a rapid acceleration of their plans by the successful Japanese lodgement on Attu and Kiska in the summer of 1942. The build-up for the expulsion of the Japanese necessarily worked to increase the size and the role of military forces in Alaska rather well beyond those envisioned in 1940.[22]

The 1939 re-examination of Alaska's place in the national defense, the 1940 War Department long-range plan, Buckner's activity on behalf of his local command, and ultimately the exigencies of war, decisively shaped the growth in the amount and kind of missions assigned to the Corps of Engineers in Alaska. In 1938 there was no Corps organization based in Alaska and there were no military projects under the control of the Engineers. Eighteen months later, the Corps was engaged in the initial stages of Alaskan mobilization. This development set in motion a variety of organizational changes. In 1939, the Seattle District created an Area Engineer for Alaska with an office in Anchorage in order to handle works then under construction. The Seattle District administered directly the first military construction activity undertaken by the Corps--surveying for airfields and aircraft detection sites.

The first contingent of the new Alaska garrison arrived in June 1940 and it contained the 32nd Engineer Combat Company. This group of Engineers was under the authority of the force commander, but he had no engineer on his personal staff. In January 1941, Capt. B.B. Talley assumed the office of Area Engineer in order to handle military construction for the Seattle District, and in August of the same year Buckner finally received an Engineer Officer for his staff in the person of Lt. Col. George W. Nold. Ten months later, in May 1942, Buckner also assumed direct command over Talley's operation but did not consolidate the Area Office with Nold's. The two activities remained administratively distinct. The Seattle District no longer exercised any administrative control over Alaskan military construction, but it remained responsible for procurement, shipping, some civilian contract administration, civilian labor, and what remained of civil works in the Territory during the war. The arrangement between Talley and Nold, which apparently worked well in practice if it was a bit awkward in theory, endured down to June of 1943 when Talley left for European duty. Nold then absorbed Talley's old responsibilities.

In November 1943, Alaska was designated a separate theatre of war; it became a Department within the Army organization and Nold became the first Department Engineer. This consolidation of military construction in a single office did not affect the continuing jurisdiction or functional responsibilities of the Seattle District. This final wartime arrangement, providing for a division of responsibility between the Alaskan theatre command and the Corps organization in Seattle formed the basis of which the Alaska Engineer District was established in 1946.

What then were the major activities of the Engineers in Alaska during the war years? Navy contractors and the Quartermaster Corps undertook the initial military expansion--the construction of the Kodiak and Dutch Harbor naval bases and the cold weather station at Fairbanks named Ladd Field. The Corps began its first construction activity when the 28th Engineer Aviation Regiment, under the supervision of the Seattle District, undertook the construction of airfields at Yakutat and Annette Island on the air route north from Seattle. This important early work was carried on under the direction of Maj. George Nold and Capt. B.B. Talley, the two Engineer officers who very shortly rose to much higher military responsibilities--the supervision of almost all military construction in Alaska. In May 1940, the Seattle District began surveys for a number of aircraft detector stations and by mid-summer of that year surveys were undertaken for the construction of a rail cut-off from the Alaska Railroad line at Portage to the port of Whittier on Prince William Sound. This latter project was pursued because of fears for the vulnerability of the Port of Seward and the rail line running north from it to Portage. [23]

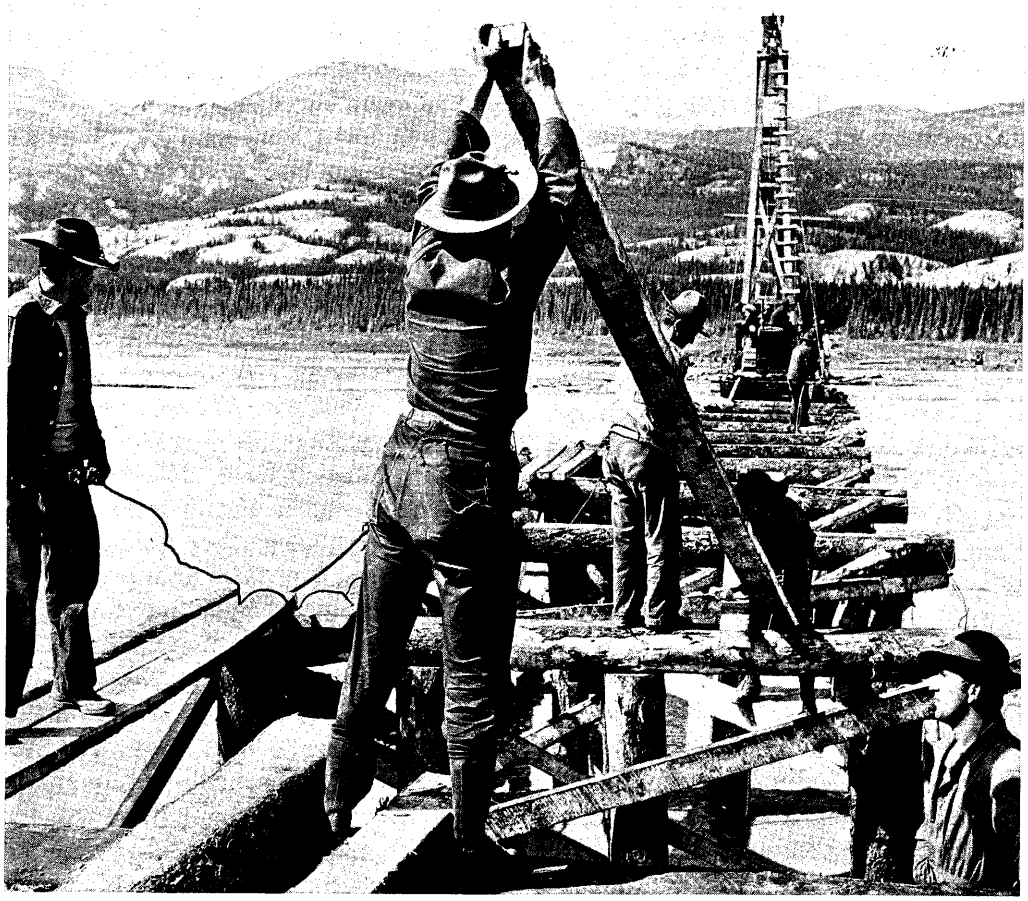
In the summer of 1940, General John L. Dewitt, the Army Commander in San Francisco urged that military construction be formally placed under the control of the Engineers. As early as September 1940, the President authorized the Secretary of War to transfer individual projects to the Corps. In January 1941, the War Department ordered the complete transfer of all military construction in Alaska to the Engineers (excluding of course, the work carried out by the Navy). [24]

From this point, the work of the Corps expanded rapidly. In the next two years, the Corps completed the facility at Fairbanks, built Fort Richardson at Anchorage, and constructed the Aleutian air fields, first to protect Dutch Harbor and the North Pacific approaches and later to serve in the expulsion of the Japanese from Attu and Kiska. In addition, the Engineers completed the Whittier cut-off in 1943 and constructed Army posts for the protection of naval facilities at Kodiak, Dutch Harbor, and Sitka.

Late in 1941, the War Department turned to two other major projects involving Alaskan defenses--the ALCAN Highway and CANOL pipeline system. Military officials were very concerned over the security of Alaskan communications. The sea route, the only means of transporting bulk goods to Alaska, was vulnerable to submarine attack. Throughout the 1930's there had been some political agitation for the construction of a road between Alaska and the continental U.S. to serve as an alternative communications link. The War Department, when asked to comment on such a project, viewed it as feasible from an engineering point of view but was not enthusiastic about its military value. The Japanese attack on Pearl Harbor quickly changed that attitude as the crippling of the Pacific fleet

considerably worsened the insecurity of Alaskan sea communications. [25]

In early January 1942, President Roosevelt requested the War and Interior Departments to study and make recommendations for the construction of a military road to Alaska. By early March, both the U.S. and Canadian governments had approved the plans for such a road to run from Dawson Creek in British Columbia to Big Delta in Alaska. By this time another consideration strongly influenced not only the question of the need for the road but also the route it was to take. There had been a large attempt to reinforce Alaska with aircraft along a chain of fields in the U.S. and Canada known as the Northwest Staging Route. The first contingents had found the going very bad indeed, so the proposal for the highway was advanced on grounds of the service which it could provide to the network of staging fields. Ultimately, this air route was used to ferry the several thousand aircraft sent to the Soviet



Army engineers bridging a stream on the Alaska Highway, 1942.

Union under the Alaska-Siberia (ALSIB) project.

When construction began, the work force was divided into three elements, one to begin at the railroad in Dawson Creek, another to start from Whitehorse (supplied via ship and rail from Seattle and Skagway) and the third from the Richardson Highway (by way of Valdez). Initially the plan called for a mere pioneer trail to be pushed through at great speed. This trail was then to be used as an access road for the construction of a finished highway. But the enormous demand for supplies generated by the working parties and the successful Japanese landings on Attu and Kiska forced the abandonment of the original plan. Clearly, events would not wait on the construction of a separate finished road and so the access road with substantial improvements became the ALCAN (now the Alaska) Highway.

This extraordinary project was brought into working condition in a bare eight months; the first trucks from Dawson Creek arrived in Fairbanks on 21 November 1942. In this extremely short period, Engineers and civilians working on the project built about 1,450 miles of road in incredibly difficult conditions involving tundra, permafrost, muskeg, glacial streams, dust, mud, and mosquitoes. It was a considerable feat, perhaps the Corps' largest single construction project since the Panama Canal. It established for the first time an all-land communication link between Alaska, Canada, and the United States. [26]

The second major project--the CANOL Pipeline system--was directly related to the Alaska Highway and the problems that had spawned it in the first place. In early 1942, there was a great deal of concern over supplying aviation gasoline to the airfields along the Northwest Staging Route. The need to fuel truck traffic using the highway increased the size of the problem considerably and led to a general examination of the larger question of fuel supplies for the entire region. After considerable discussion of the problem between officials in the War Department and the petroleum industry, the president approved a fantastic project designed to make use of "local" oil resources. The "local" oil field involved was located at Norman Wells on the Mackenzie River just below the Arctic Circle. Four wells existed there, pumping about 800 barrels of crude per day for the use of local mine operators. The project called for the further development of the oil field (up to a daily production of 3,000 barrels) and the construction of a pipeline from the field to Whitehorse where a small refinery was to be built. It required the development of a communications and transportation system to move supplies to Norman Wells and build the pipeline itself; it also called for the purchase, disassembly, transportation to Whitehorse, and reassembly of an existing oil refinery. All of this work was to be done in a year's time. Needless to say, there was considerable skepticism about the project, but the fear of further deterioration of Alaska's strategic position overrode any reservations at the outset. [27]

The project, named CANOL (Canadian Oil Line), began in May 1942. As it developed and experienced delays, several additions were made to the original plans--a pipeline from Skagway to Whitehorse (CANOL 2), another from Whitehorse down the Alcan Highway route to Watson Lake (CANOL 3), and a third line running north and west from Whitehorse to Fairbanks (CANOL 4). Gasoline flowed through CANOL 2 by midsummer 1943 and in April 1944, the first oil from Norman Wells flowed to Whitehorse where a small Texas refinery had been transplanted. The line from Whitehorse to Fairbanks became functional in February 1944.

The entire affair involved about 4,000 Engineers and 10,000 civilians at its height and the final cost stood around $130 million. Unfortunately, the usefulness of the project was directly tied to the Japanese threat of 1942 and early 1943 and it was not economically justifiable in other than emergency circumstances. As a consequence, the crude oil line from Norman Wells and the Whitehorse refinery were shut down in April 1945. But the line from Skagway to Whitehorse was kept in operation; it had reduced the cost of transporting a barrel of gasoline between those two points from $8.40 to a mere 23 cents.[28]

Still another project involving communications and transportation deserves attention--the proposal for a Trans-Canadian, Alaska and Western Railway. In 1942, Engineers were directed to conduct a survey for a railroad connecting Canada and Alaska, more specifically a line running from Prince George, B.C., to Teller at Port Clarence on the Seward Peninsula. In addition, the study was to examine the possibility of a harbor at Port Clarence as well as a pipeline to run from Tanana to Teller. All of this was to be done with a view to providing means to transport war cargoes in support of the Soviet Union in its rather desperate struggle against Nazi Germany.

The surveying began in 1942 under the jurisdiction of the Anchorage Area Office of the Seattle District. At the conclusion of the survey, the working party estimated that the 2,147 mile line (including the pipeline) would cost about $203.5 million. The harbor, including floating concrete docks, warehousing, and related facilities was expected to cost about $26.5 million. The urgencies of war eased in 1943 as the U.S. forces drove the Japanese from the Aleutians and the Russians decisively defeated what turned out to be the last major German offensive in the east at Kursk in July of that year. This change in the military situation led to the dropping of the railway project and the beginning of a reduction of the military forces in Alaska.[29]

Some note should be made of the fate of civil works in the Territory during the war. In general it can be said that everywhere military requirements forced the curtailment or suspension of most projects. There was almost no new investigation of new projects in this area. The Seattle District did manage to carry on something of a limited

effort despite the competition of military construction. They improved the Lowell Creek diversion at Seward, maintained the Nome Harbor, continued to improve the harbors at Skagway and Juneau, and completed a flood control project at Fairbanks. [30] Each of these, however, were civil projects important for their contribution to military requirements. Seward was, in addition to the new port at Whittier, the southern terminus of the Alaska Railroad; Skagway and Juneau were vital centers in the shipping chain from Seattle; and Fairbanks possessed Ladd Field, the cold weather testing station and transfer point for aircraft supplied under the ALSIB program. Nome was another staging point for ALSIB.

GENERAL SUMMARY

In summarizing the Engineers' work in Alaska between the purchase from the Russians and the end of World War II, several important features emerge. The most important thing to keep in view is that at the end of World War II, Alaska possessed a transportation system, rudimentary in some ways, but nonetheless a system that included water, rail, road, and air communications. The Army Corps of Engineers was either directly or indirectly responsible for much of this fundamental aspect of Alaskan development.

Initially the Corps came to Alaska in the person of a single Engineer officer engaged in exploration. In the first decade of the twentieth century, the Corps was drawn into a modest civil works program by the need for transportation improvement generated largely by the gold rush. By the mid 1920's the Engineers had developed a clear pattern for their civil works in the Territory of Alaska, one that centered on the construction of harbors and the provision of safe navigation, particularly in southeastern Alaska. This work was the beginning of a continuing contribution to the development of the social capital required to maintain economic life in an area so dependent on the sea.

World War II dramatically expanded the amount and type of work done in Alaska by the Corps. Before the war, the Engineers had done very little work in interior Alaska, apart from those individuals who worked on the Alaska Railroad and the various highways. The Alaska Highway, CANOL, construction at Fairbanks and Anchorage, the myriad of airfields, small bases, and detector stations changed all that and provided the Corps with a fund of experience under circumstances they had rarely encountered before, experience that became very important in the post-war years.

Most important of all, however, the Engineers made a vital contribution to the development of defense facilities in Alaska--the establishment of the first large-scale military presence in the Territory. Despite the lessened strategic importance of the region after the defeat of the Japanese in the Aleutians, the military presence re-

mained. The enduring military establishment bred by World War II clearly required a continuing military responsibility for the Corps of Engineers and that responsibility in its turn led directly to the creation of the Alaska Engineer District.

Mount McKinley, highest in North America.

Footnotes for Chapter One

1. George W. Rogers, *The Future of Alaska; The Economic Consequences of Statehood,* (Baltimore: John Hopkins Press, 1959), 63.

2. USACE, Portland District, *The History of the Portland District, Corps of Engineers, 1871-1969,* (Portland, 1970, 79-81).

3. The Survey for the wagon road was begun in 1904 under the direction of Major John Millis of the Seattle District. *Annual Report of the Chief of Engineers* (hereafter cited as *ARCE*), 1904, p. 744. J.M. Clapp later assumed direction of the project. *ARCE,* 1905, pp. 4217-18. For the construction of the Alaska Railroad see Bernadine L. Prince, *The Alaska Railroad, 1914-1964,* 2 v. (Anchorage, 1964). The role of the Army in roadbuilding in Alaska is summarized in USARAL, *The U.S. Army in Alaska,* (Anchorage, 1972), 66-7, 77-8.

4. Oscar J. Ferrians, Jr., Reuben Katchadoorian, and Gordon W. Greene, *Permafrost and Related Engineering Problems in Alaska,* (U.S.G.S., 1969). Professional Paper #678 in Alaska District Library.

5. Raymond's account of the voyage is contained in *Senate Report 1023*, 56th Congress, 1st Session, 1900, "Compilation of Narratives of Exploration in Alaska." The best secondary account of army exploration is Morgan Sherwood, *Exploration of Alaska, 1865-1900*, (New Haven: Yale University Press, 1965). According to Sherwood the journey was made in response to complaints made to the War Department by American traders who had come into conflict with the Hudson's Bay Company.

6. Sherwood, 92-3.

7. *ARCE*, 1897, Appendix TT; also *Senate Document 19*, 54th Congress, 2nd Session, 1897.

8. USARAL, *U.S. Army in Alaska,* 66,77; on WAMCATS, see 53-65.

9. Wrangell Narrows is a 21 mile passageway on the sheltered route between Seattle and Skagway. The survey is described in great detail in *ARCE*, 1904, 3663-7. An "examination and survey" is the gathering of engineering and such other data as are required to define a project and request congressional authorization for it.

10. *ARCE*, 1912, 1264-6. Also the appropriate sections of *ARCE*, 1909-11. *House Document 389*, 59th Congress, 2nd Session, 1907.

11. *ARCE*, 1912-16; *House Document 556*, 62nd Congress, 2nd Session, 1912; *House Document 991*, 63rd Congress, 2nd Session, 1917.

12. *ARCE*, 1922, p. 1972; Alaska District, *Project and Index Maps*, (Anchorage, 1972), pp. 2-3.

13. *Proceedings of the 58th Congress*, 3rd Session, ch. 1482, 1905, pp. 1145-46.

14. *ARCE*, 1917, pp. 1788-9; *House Document 1932*, 64th Congress, 2nd Session, 1917.

15. The great bulk of this work was authorized by the Rivers and Harbors Acts of 1925,27, and 1930. The figures in this paragraph are compiled from *House Document 1491*, 76th Congress, 3rd Session, 1940, Vols. II and III.

16. Lowell Creek formerly flowed through Seward where it had an unhappy record of flooding. In 1927, the ARC built a rock fill dam which diverted the creek to a timber flume running through the city. This remedy proved to be inadequate and in 1937, the Seattle District began the construction of a new dam to divert the stream through a tunnel drilled in Bear Mountain thereby bypassing the city altogether. See the section on Flood Control Projects in Chapter III.

17. The figures in this and the following two paragraphs are compiled from *House Document 1491* cited above in note 15.

18. For an example of the political advocacy of Alaskan strategic importance, see Ernest Gruening, *The State of Alaska*, 2nd ed., (New York: Random House, 1968), 456, see also 309-13. The principal early advocates of Alaska's military significance were air power enthusiasts who based their arguments on the route to Japan from the West Coast via the Great Circle route. See Alfred Hurley, *Billy Mitchell, Crusader for Air Power*, (Bloomington: University of Indiana Press, 1975), 86-7.

19. For a detailed narrative of the development of national defense policy in connection with Alaska, see Stetson Conn, Rose C. Engelman, and Bryan Fairchild, *The U.S. Army in World War II, The Western Hemisphere. Guarding the U.S. and its Outposts,* (Washington: G.P.O., 1964).

20. *Ibid.*, 224.

21. *Ibid.*

22. For an account of Buckner's policy see Brian Garfield, *The Thousand Mile War.* (New York: Doubleday, 1969), passim.

23. The data on the evolution of Engineer administration is drawn from Karl C. Dod, *U.S. Army in World War II: The Corps of Engineers, The War Against Japan.* (Washington: G.P.O., 1966), 10-11, 33-38, 333.

24. *Ibid.*, 33-8.

25. Dod, 229.

26. *Ibid*, 299-318.

27. This discussion is based on the narrative in Dod, 318-28.

28. *Ibid.*, 339.

29. USACE (Anchorage Area Office), *Reconnaissance for Railroad or Highway West of Fairbanks*, (Anchorage, 1942); USACE, Seattle District, *Survey, Trans Canadian Railway Location*, (Seattle, 1942); USACE, Seattle District, *Report on Rail and Port Surveys,* (Seattle, 1943).

30. *ARCE*, 1942-45.