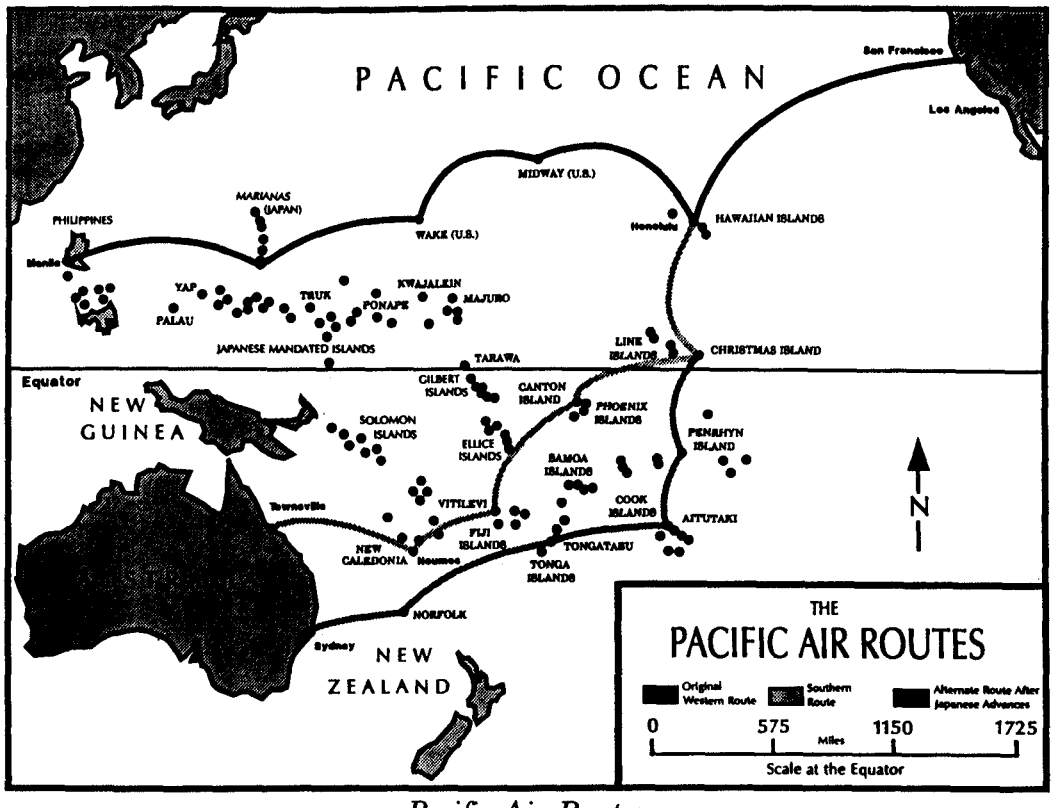
Air Ferry Routes Across the South Pacific

by Donald T. Fitzgerald

As the Japanese threat in the Far East increased in 1940, General Douglas MacArthur planned that in the event of war the Air Corps would play a major role in defending the Philippines. He also felt, as many others did, that the Japanese would not launch any attacks until the end of the 1942 monsoon season. The ensuing months would provide enough time for the Air Corps to ferry additional B-17 Flying Fortresses from the United States to the Philippines. The bombers would fly the route from California to the Territory of Hawaii, the islands of Midway, Wake, and Guam, thence to Clark Field on Luzon. However, this western route, which passed close to Japan's mandated islands, became more vulnerable as tension grew between the United States and Japan.



Pacific Air Routes

To provide a safer air ferry route, the Army Corps of Engineers Honolulu District created a new southern route to the Philippines. Airfields were built on islands and atolls stretching from Hawaii southward through the Line and Phoenix Islands, Fiji, New Caledonia, Australia, and on to the Philippines.

The Japanese, however, did not wait for the monsoon season to pass. After their air attack on Pearl Harbor, Japanese ground forces quickly occupied the Philippines and began advancing through the Southwest Pacific threatening the newly constructed southern air ferry route. To counter this threat, the engineers constructed an easterly alternate route farther removed from Japanese advances.

While developing this network of island airfields, the Pacific Ocean Engineers improvised unique logistics and engineering procedures, created specialized airfield construction units, and developed new methods of runway construction. Begun as part of America's prewar preparations, the air ferry route project became a vital element in the Southwest Pacific offensive wartime strategy.

This strategy, stated in the nation's 1924 War Plan Orange, assumed that in the event of war in the Pacific the United States would fight Japan alone; would wage primarily a naval war; and would conduct an offensive campaign to seize Japan's mandated islands, reinforce the Philippines, and finally attack Japan itself.

After the 1938 Munich Conference, and in view of Japan's increased military strength and America's military weakness, War Plan Orange was replaced by a series of Rainbow War Plans. One of these scenarios assumed that Japan would become allied with Germany and Italy and, after a prolonged period of strained relations, would attack the United States without warning.

This Rainbow Plan also assumed that Japanese forces would probably raid the U.S. territories in the Pacific and the West Coast. To counter this probability, the Rainbow Plan called for building up the defenses of Alaska, the Panama Canal, and Hawaii, called the "Defense Triangle" by military planners. Despite this military plan to increase the nation's defenses, Congress in 1940 reflected the public's lack of alarm by cutting to $4 million the War Department's request of

$18 million for the Defense Triangle, eliminating Alaska's proposed allotment completely and cutting the amount proposed for Hawaii in half. After France surrendered, however, Congress rushed to strengthen America's defenses.

When Major General Walter C. Short assumed command of the Hawaiian Department in February 1941, he continued this renewed emphasis on constructing Hawaiian defenses. To accomplish this, Short was able to call upon two engineer organizations: the Hawaiian Department's 3d Engineer Combat Regiment stationed at Schofield Barracks on Oahu's central plain; and the Corps of Engineers Honolulu Engineer District (HED), which had been established in 1905.

The first Army engineers in Hawaii, however, were the 2d U.S. Volunteers, who arrived in June 1898, two months after the United States declared war on Spain. The following year, their commander, Major W. C. Langfitt, drew up the Hawaiian defense plan. In 1899 Congress appropriated funds for the engineers' first construction project, dredging the entrance to Pearl Harbor. The heavy guns called for in Langfitt's coastal defense plan were not installed, however, until after the turn of the century.

Battery Harlow, Fort Ruger on the north side of Diamond Head, Hawaii. The battery of 12-inch mortors, completed in 1910, was the first modern coastal defense battery constructed to protect Hawaii from invading fleets.

Designed with the time-honored formula of bombarding approaching enemy warships and defending shorelines against invading armies, Hawaii's defenses consisted of 12-inch and 14-inch gun batteries, large mortars, and electrically mined harbor entrances protected by smaller gun emplacements.

In the 1930s, the concept of defending against air attack entered the nation's defense formula. Skyward pointing listening devices and antiaircraft gun emplacements were added to Hawaii's defenses. Then, with the development of the technology of radio detecting and ranging (RADAR), the engineers also began constructing a system of aircraft warning stations.

To accelerate the modernization of the nation's defense system and help it recover from the Great Depression, New Deal funds and labor were often transferred from public works to military construction projects such as gun emplacements, access roads, and ammunition storage facilities.

By late 1939, serious preparations for the possibility of another war in the Pacific were in full swing in Hawaii.

Fort Ruger's 16-inch guns stand ready to protect Hawaii against an enemy that never returned after striking Pearl Harbor,

On 15 July 1940, when Major Theodore Wyman, Jr., assumed command of HED, he continued those plans. In addition to assuming the standard district engineer's duties, however, he

also became works projects administrator in charge of Works Progress Administration (WPA) affairs in the Territory of Hawaii, and deputy contracting officer for the Civil Aeronautics Authority (CAA), which was developing territorial airports.

Wyman kept working on Hawaiian defense construction projects with their continued orientation towards air warfare. The Honolulu district engineer supervised the dredging of Keehi Lagoon to create seaplane runway areas (the dredged material from the lagoon was used to build John Rogers Municipal Airport), and improving civil airfields on Oahu and the outer islands. Wyman also started facilities to store 250,000 gallons of 100-octane aviation gasoline, continued constructing a series of aircraft warning stations on all the islands, and installed additional coastal defense guns and facilities.

The method of constructing Hawaii's military airfields and civilian fields with military application vividly illustrated the fragmented approach to national defense efforts which

U.S. Army fighters, pursuit planes, and bombers line up at Luke Field, Ford Island, Pearl Harbor, 1924. By this time, aviation technology, which extended Hawaiian defenses hundreds of miles seaward, was replacing the coastal defense gun system.

existed in 1940. At that time, the Quartermaster Corps constructed all Air Corps stations including their runways and facilities. To construct an air station, the Quartermaster

called upon the Corps of Engineers to do the initial survey, and called on the officer in charge of the Air Corps Building and Grounds Division to approve each design. The CAA, in building its airfields, called on the Department of the Interior for its survey work. Airfields were constructed either by troop labor, civilian labor contracted by the Quartermaster, or by workers from the WPA. Funds for airfield construction came either from the Army Air Corps, special defense legislation, or, as America became more concerned about the deteriorating situation in Europe, from the WPA itself.

In November 1940, a major change occurred in the Corps of Engineers which improved this system, and also introduced the HED to an entirely new role. During the Great Depression, the Corps of Engineers had built many large civil works projects under Franklin Roosevelt's New Deal programs. These included reservoirs, dams, hydropower facilities, and other civil works projects. As war clouds gathered, however, Roosevelt and Congress began shifting funds from civil works to military construction. As funds for civil works projects diminished, the Corps faced a declining work load and an uncertain future. To correct this situation, Army officers who were engineers exerted influence within the Army and on members of Congress to have Air Corps station construction transferred from the Quartermaster Corps to the Corps of Engineers. Their efforts were strongly supported by newly appointed Army Chief of Staff General George C. Marshall.

The campaign met partial success when, on 9 September 1940, President Franklin D. Roosevelt signed legislation authorizing the Adjutant General to transfer responsibility from the Quartermaster Corps to the Corps of Engineers for "all work pertaining to all construction at Air Corps Stations (Panama excepted), including that now in progress." The path was now open for the Honolulu district engineer to build military airfields. The engineers did not have to wait long for that opportunity.

In October 1941, the War Department directed General Short to construct a new southern route of Pacific island airfields which would allow B-17s to fly to the Philippines avoiding Japan's mandated islands. Assigned the job by Short, District Engineer Wyman called into his office DeWitt Clinton Wolfe, an engineer with the St. Louis engineering

firm of Sverdrup and Parcel. Wyman pulled down his window shades and explained the secret air route project to Wolfe. He asked Sverdrup and Parcel to survey the proposed route, select the best islands on which to site runways, and do whatever was necessary to "see to it that they're built." Wolfe relayed the request to company president Jack Sverdrup who turned the job down! Instead of taking no for an answer, Wyman asked the Chief of Engineers, Lieutenant General Eugene Reybold, to convince Sverdrup to take on the project.

Wyman's strong desire to have Sverdrup do the ferry route survey was based on a long professional relationship between these two engineers. Sverdrup, who in 1927 had formed his engineering firm with his former University of Minnesota professor John Ira Parcel, had signed his first contract with the Corps in 1933. He was hired to do work connected with the Fort Peck hydropower project by the Kansas City district engineer, a feisty young major named Theodore Wyman, Jr. Sverdrup's firm then went on to provide bridge plans for the Corps tidal-range project at Passamaquoddy Bay, Maine in 1935 and plans for three bridges to be constructed over the Panama Canal.

That same year Wyman was transferred to the Los Angeles District, where he asked Sverdrup to submit a bid on the Los Angeles flood control plan. Complying with Wyman's request, Sverdrup's bid was lower than several competing companies, gaining him a contract. Sverdrup did the design work in St. Louis while Wolfe supervised the flood control work from a newly established Los Angeles office.

When Wyman transferred to the Honolulu District Office in 1940, he asked Wolfe to sail to Honolulu. Upon arrival, Wyman briefed him on several small military construction projects that were available. Despite Wyman's assertion that there probably would be more work in the future, Wolfe turned down the projects and returned to Los Angeles. Unbeknownst to him, however, Sverdrup had previously committed the firm to design some bomb shelters in Hawaii. When he discovered this, Wolfe turned around, went back to Honolulu, and supervised the bomb shelter project. It was then that Wyman called him into his office, briefed him on the secret air route project, and finally asked General Reybold to urge Sverdrup to take the job.

Reybold was able to convince Sverdrup to accept the air route project. After traveling by train from St. Louis to San Francisco, Sverdrup flew Pan American Airways' famed China Clipper to Honolulu. He then began the project which reestablished his association with Wyman, surveying and building airfields for B-17 flights across the South Pacific.

Aircraft flights across the South Pacific, however, were not new. In 1928 Australian aviator Charles Kingsford Smith and his crew had flown the wheeled tri-motor *Southern Cross* from San Francisco to Sydney by way of Hawaii, Fiji, and Brisbane. In addition, Pan American Airways flying boats had been providing regular passenger service from the United States to the Philippines since 1936. Pan Am had also constructed seaplane operating facilities in the Phoenix Islands and New Caledonia to service its flights to Australia. Although aviation facilities were not new to the South Pacific, the air route which the engineers were about to build was a more ambitious system than anything in existence.

General Short ordered Wyman to construct ten primary and five alternate airfields, each to have at least one 5,000-foot runway capable of handling heavy bombers. To complete the project, General Short was allocated $5 million from the appropriation entitled "Defense Aid, Aircraft and Aeronautical Material (Allotment to War) 1941-1943." The War Department directive labeled the project so urgent that its completion "must be thought of in terms of weeks not years." The first runway was to be completed by 15 January 1942, in about 13 weeks.

An early B-17E lands at Eastern Island, Midway on its way to the Philippines The proximity of Midway, Wake, and Guam to the Japanese mandated islands prompted the War Department to build the South Pacific Air Route island bases. ***(Smithsonian)***

The ferry route was to consist of a series of runways which would link Hawaii, the Line Islands, the Phoenix Islands, Fiji, New Caledonia, and Australia, with the Philippines. Since the route paralleled the Pan American flying boat route, Pan Am base facilities such as communications stations could be used when possible. Although the airfields were primarily designed for bombers, they were also seen as a way to ferry fighter aircraft to Australia. The fighters would be assembled in Hawaii, or shipped there on aircraft carriers or as deck-load on cargo ships. The initial mission, however, was to provide a safe ferry route for B-17s.

The question of which field should be built first was settled when Wyman was told that although Canton was given priority over Christmas, both islands "should be made usable at the earliest possible date." The United States and Great Britain jointly claimed the two islands. Christmas Island, about 1,400 miles south of Hawaii, was 10 feet above sea level, 35 miles long and 20 miles wide, and the largest coral island in the Pacific. Its once numerous coconut plantations had been abandoned after the collapse of the copra market, and the island was now populated by two settlements of returned Polynesians and a British resident commissioner. To gain information on Christmas Island, Wyman sent Air Corps Major Roger M. Romey and Engineer Captain Stanford MacCasland on a reconnaissance trip by Navy seaplane. At the same time an engineer survey party, including Major B. L. Robinson, departed for the island aboard a Navy destroyer. After surveys indicated that runway construction was feasible, work started about 15 October 1941.

Canton, about 1,000 miles southwest of Christmas, consisted of a narrow strip of coral enclosing a pear-shaped lagoon measuring 8 by 4 miles. Wyman and his staff had some knowledge of Canton from the CAA which had shared plans it had prepared to construct an airfield on the island. To confirm the suitability of the island for runway construction, an engineer from the Honolulu District flew there by Pan Am Clipper on 21 October. With the sites selected, the work could now get under way.

But as soon as the project began, the district engineer faced problems in almost every possible area including labor, supplies, communications, and building equipment. The first

question Wyman faced was where he would obtain workers. When the Corps of Engineers began building Air Corps stations in the United States, it developed engineer aviation units specially trained to construct airfields. The 28th Engineer Aviation Regiment worked on Annette Field on the Alaskan panhandle in July 1940 at the insistence of Lieutenant General John L. DeWitt, commander of Alaskan defenses. When the United States acquired British bases in the destroyer-base agreement the following month, General Marshall assigned the construction of U.S. air bases to the Corps of Engineers. The Hawaiian Department received its first contingent of aviation construction specialists in April 1941, when the 804th Aviation Company arrived from the United States.

Short and Wyman agreed that the work on Christmas would be done mainly by these military engineers, assisted by some civilians. On Canton, however, they decided that labor would be supplied by Hawaiian Constructors, a company formed by three contractors from Nebraska and Nevada. Because most skilled workers were finding jobs in West Coast defense plants, Hawaiian Constructors was having a hard time finding qualified construction men for the ferry route project. Wyman's decision to rely heavily on civilian workers was soon to present him with untold headaches.

Wyman's next challenge was how to obtain and deliver supplies. The Navy supply ship USS *Antares* was to transport officers, troops, and civilian engineers and construction men to the two islands. (It was this same ship, returning from its second supply trip, that discovered a Japanese midget submarine as it attempted to enter Pearl Harbor early on the Sunday morning of the Japanese air attack.) Canton's problems started with the first supply run of the *Antares*. The ship departed Honolulu on 3 November towing four barges which carried the area engineer, Captain C. D. Baker, and about 200 troops, civilian workers, and their equipment. Eleven days later, the ship arrived off Canton with a quartermaster barge and a derrick barge; the two other barges had sunk, taking most of their equipment to the bottom. The construction crew that arrived on the island a week later was not an impressive looking group, but it was the best that Hawaiian Constructors could provide.

The Army–Navy Munitions Board had assigned top priority to the ferry route's material requirements. However, construction materials often lay piled up on San Francisco docks due to a shortage of ships. Additionally, as construction activities increased, maintaining communications between Honolulu and the islands became more and more difficult. Cable, wireless, and Pan American Airways communications facilities soon became overloaded. In order to solve these problems in logistics and communications, District Engineer Wyman chartered the former interisland steamship SS *Haleakala*. The ship delivered supplies throughout the project, and its radios maintained communications between the construction sites.

The problem of construction equipment shortages led the engineers into the field of diplomacy. From the beginning of the project, heavy construction equipment was in short supply. Before any civilian equipment arrived from the United States, the Hawaiian Department headquarters loaned Wyman some that belonged to the 804th Engineer Aviation Battalion (formerly company). General Short warned the Honolulu engineers, however, that he expected that the airfield project would probably wear out the equipment—a not so veiled hint that he expected the Honolulu District to use project funds to replace the worn-out equipment with new.

This solved the immediate need for equipment on Christmas and Canton islands. On Fiji and New Caledonia, however, only the foreign national or colonial governmental agencies constructed public works, hence only they owned heavy construction equipment. Civilian contractors, who were limited to the building trades, had none. Therefore, to obtain equipment, the Army engineers had to conduct diplomatic negotiations with the foreign agencies. Fortunately, the colonial powers and local governments were very cooperative. The Free French provided personnel and some equipment for work at Tontouta and Plaines des Gaiacs on New Caledonia. New Zealand provided all the labor and most of the equipment for work at Nandi in the Fiji Islands.

The air ferry route, however, was more than a well-coordinated engineering project in the South Pacific. It was the arrival of bulldozers and steamrollers into simple cultures centered around lagoons, fish lines, and nature. It was the

machine entering the Polynesian garden. But for Army engineers it was exciting and creative engineering, administrative and logistic innovation, and a thrilling personal challenge.

It was also an extension into the Pacific Ocean area of New Deal engineering whose energy and innovation were being transferred from civil works to military projects. In the ferry route project, this innovation even created the very materials with which runways were constructed.

In the late 1930s, most Air Corps airplanes operated off turf airfields. Even the B-17s flying to the Philippines landed on Clark Field's turf runways. Many U.S. airports, however, were beginning to build runways with asphalt. When the Corps of Engineers took over building Air Force stations, road building methods were used to build aircraft runways, parking areas, and taxiways. Layers of crushed rock were coated with tar or asphalt called tarmac or macadam, after its early 19th century Scottish inventor, John L. McAdam. Such surfaces, however, soon proved too weak to support the larger bombers which were being developed, such as the XB-19. To support such heavier aircraft, engineers began building runways of cement which pilots greatly preferred for their strength, smoothness, and all-weather capabilities.

When Army engineer aviation units started building runways on Pacific atolls and islands, they had neither asphalt nor cement. To solve this problem the engineers on Canton and Christmas islands soon developed coral, a construction material previously known to few Americans. Used for construction in some tropical areas, little was known elsewhere about coral or its use as a building material. Made up of skeletons of minute spherical marine animals, coral was chemically similar to limestone. Army engineers found that if it was crushed, rolled, and watered with either fresh or salt water, it became hard enough to use for roads and runways. If allowed to become dry, however, it rutted, powdered, and blew away. To prevent this problem the crushed coral was topped with tar, later with asphalt, and sometimes with a mixture of water and molasses. Coral runways, which were soon being constructed throughout the Pacific, had their origins in the prewar HED ferry route project.

Such improvisation produced steady progress. In the hectic months of November and early December 1941, Wyman's

engineers worked intensely to complete the route by the approaching deadline. The Japanese attack on 7 December not only forced the engineers to redouble their efforts, it also forced them to reorganize the entire air route.

The Japanese advance moved swiftly and cut deeply. The same day that they attacked Pearl Harbor, they launched assaults on the Philippines, Guam, Midway, and against British forces in Hong Kong and on the Malay Peninsula. The B-17s at Clark Field were destroyed before they could get into the air. Hope of defending the Philippines collapsed as MacArthur led his forces into the labyrinth of the Corregidor fortress. With the Philippines lost, the air route now became a lifeline to Australia, and the race was on to deliver aircraft to help in its defense.

As emergency crews battled fires at Hickham Field and Navy salvage divers searched the murky waters of Pearl Harbor, the 804th Engineers and civilian workers were clearing and grading runways on Christmas and Canton islands. Natives on Fiji were lengthening runways while the New Zealand government was providing a steady flow of equipment and material. On New Caledonia, aided by the Free French, Lieutenant Richard P. Saeur was making headway on the airfields at the Plaines des Gaiacs and Tontouta. Progress was being made toward the original deadline of 15 January, which was now more imperative than ever.

But in addition to an approaching deadline, there was an approaching enemy. The Japanese invasion of Tarawa in the Gilberts and Guadalcanal in the Solomon group threatened the route, especially the airfield on Canton. As the enemy continued to advance, General Short decided to evacuate the civilian workers from Canton and move them to New Caledonia to complete that field as quickly as possible.

More than 200 Canton workers climbed onto a barge, set up canvas shelters from the sun, and began the slow trip under tow toward American Samoa. While en route to the American possession, food and water ran short, sea sickness was widespread, and sanitary conditions were deplorable. An engineer recorded that the misery of the journey was "something each of them will never forget as long as they live." When the sick and weary workers stopped off at Samoa,

they were dismayed by the U.S. Naval Governor's order to remain on the anchored barge under quarantine. After baking in the sun for three days, the workers were struck by an epidemic of amoebic dysentery, causing the governor to finally allow them ashore to receive medical treatment. Once they regained their health, the workers continued their voyage to New Caledonia.

When the civilians departed Canton, Captain Baker and about 130 troops had remained to complete the runways. They were also prepared to defend the island with the arms General Short had sent: two 75-mm. cannon, 800 rounds of ammunition, a dozen machine guns, and a sergeant to train the engineers to fire them. Although the work continued, living conditions were deplorable and morale was low.

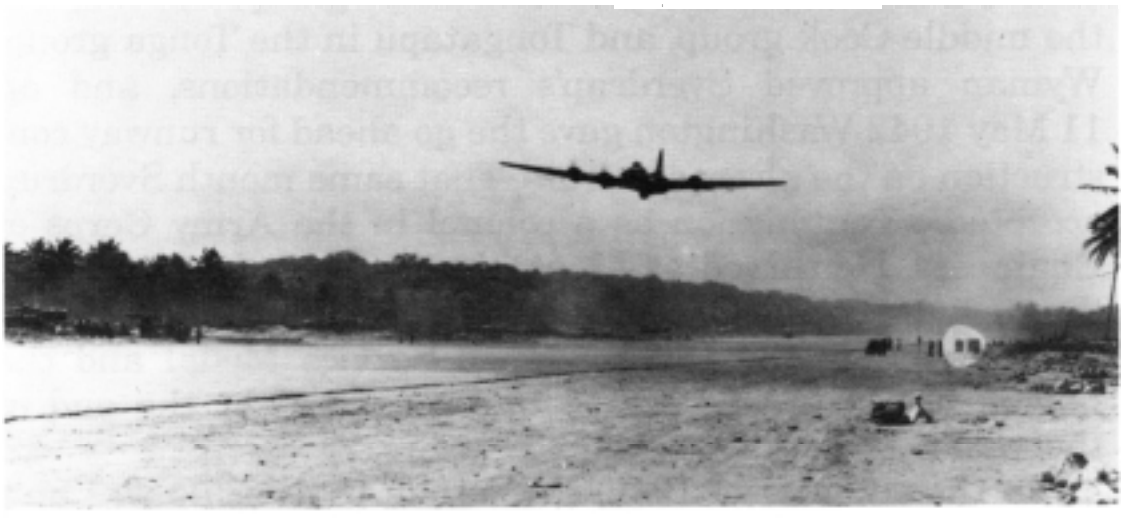
Unlike Canton, Christmas Island was not directly threatened by the Japanese advance. Yet events transpired there which led the civilian workers to near rebellion. Friction had developed between the Honolulu engineer officer in charge, Major John E. Shield, the Hawaiian Department military engineers, and the Hawaiian Constructors civilian workers. Dissatisfactions arising from food and water shortages were compounded when Major Shield began countermanding orders of the civilian supervisor. Less than an efficient group to start with, the workers became a confused and disorganized gang. Shield also alienated the 804th Engineers by not cooperating with them.

Shield, however, was not the only one causing friction. A military engineer officer told some of the civilian workmen that they would all end up in front of a Japanese firing squad, causing them to demand return passage to Honolulu. To quell the clamor, Shield declared martial law, enforced a seven-day work week, and prohibited anyone from leaving the island. The situation was not helped by the daily English language broadcasts from Germany of British propagandist Lord Haw Haw (William Joyce). Despite the secret nature of the air route project, he knew about the airfield being constructed on Fiji, and asked the engineers to hurry "so that the Japanese would have a nice place to land." Morale on Christmas was extremely low.

Meanwhile, work on the New Caledonia airfields at Plaines des Gaiacs and Tontouta progressed rapidly,

especially after the civilian workers arrived from Canton. In addition to their engineering duties there, Saeur and MacCasland assumed a series of unique additional assignments. After Pan Am evacuated its employees at the outbreak of hostilities, Saeur and MacCasland successfully operated the seaplane base for military use. Then, when an outbreak of bubonic plague prevented the Sverdrup and Parcel firm from bringing in civilian engineers and draftsmen from the United States, Saeur and MacCasland took over the work of architect-engineers. Perhaps their most unique role, however, involved international negotiations. Rear Admiral Thierry d'Argenlieu, the new Free French high commissioner, would only negotiate with the Army officers. With full cooperation from the New Caledonian and French authorities, progress was steady.

On 28 December 1941, 18 days after the Japanese invaded the Philippines, Colonel Wyman announced that the air ferry route was capable of handling Air Corps bombers. Between 3 and 12 January 1942, a flight of three B-17s completed the trip to Townsville, Australia, using airfields completed on Canton, Nandi, and Tontouta. The pilots reported the runways to be excellent. The trouble on Christmas Island had delayed its completion, but on 21 January a flight of B-17s landed on its runway, shortening the first leg of the journey from Hawaii by nearly 700 miles.



Army engineers applied lessons they learned from constructing the South Pacific Air Route project to building airfields fir U.S. forces waging the Southwest Pacific campaign, Port Moresby, New Guinea. (Smithsonian)

Although the ferry route was operating, the Japanese army had advanced rapidly; they were in the Gilberts, and by May 1942 on Tulagi in the southern Solomons. Now the security of the entire route was threatened. Earlier in the year, Wyman had anticipated the need for an alternate route —one less likely to be overrun by the Japanese. With the approval of Washington and authorization by General Short, he contracted with Sverdrup to survey islands to the east of Canton and Christmas in order to construct an alternate and safer ferry route.

Wyman was determined that when building the alternate route airfields he would profit from the experience gained on Christmas and Canton islands. He had come to the conclusion that American workmen were not "temperamentally suited" to work on isolated and confined islands without the benefit of amusements or recreation facilities. Since he could not provide either, in planning for the alternate route, he insisted that Sverdrup select islands having indigenous populations with work habits learned in agriculture or mining. In addition, unloading supplies at Christmas and Canton had been complicated by coral reefs, shoals, and rough water in unprotected anchorages. Wyman therefore ordered Sverdrup to select islands with good natural harbors or lagoons, and enough elevation to minimize damage from storm-tossed surf.

After visiting 13 islands, Sverdrup found three good sites which eventually comprised the alternate route to Australia: Penrhyn Island in the northern Cook group, Aitutaki in the middle Cook group, and Tongatapu in the Tonga group. Wyman approved Sverdrup's recommendations, and on 11 May 1942 Washington gave the go-ahead for runway construction on the alternate route. That same month Sverdrup accepted a commission as a colonel in the Army Corps of Engineers. He served as MacArthur's chief of construction throughout the Pacific campaigns, received numerous decorations including the Distinguished Service Medal and the Legion of Merit, and was a major general at the end of the war.

In the summer of 1942, the war in the Pacific was at a crucial juncture with Japanese forces threatening to sever the line of communications between the United States and Australia. By the fall of that year, however, the alternate ferry

route was providing a vital air link between the two nations. The following year, Allied forces had consolidated their strength and began their offensive drive towards the Japanese home islands and eventual victory.

The statement often made that World War II was "an engineer's war" was graphically illustrated by the air ferry route construction program. American and Japanese construction forces raced each other to complete runways which could bring victory in the next battle. Time and distance pressed on both forces. While American Army engineers were building airfields on New Caledonia, the Japanese were building airfields on Guadalcanal, only 800 miles away.

The air ferry route project was intensive, innovative, and creative. Started during America's preparation for war, the project developed management techniques, construction materials, and innovative procedures which were used successfully throughout the war. The successful Southwest Pacific campaign relied heavily on air operations conducted from island airfields built with methods developed on the Pacific engineers' air ferry route project.

Sources for Further Reading

This essay is based on a narrative on the air ferry routes project in Erwin Thompson's *Pacific Ocean Engineers: History of the U.S. Army Corps of Engineers in the Pacific, 1905–1980.*

A summary history of the Honolulu Engineer District during World War II is contained in the three volume series: *Historical Review, Corps of Engineers, United States, Covering Operations During World War II, Pacific Ocean Area,* by Lieutenant General Robert C. Richardson, Jr., Commanding General, Oahu Engineer Service, Honolulu, undated.

A brief narrative of the district's activities during World War II is found in an unpublished manuscript by Lieutenant Colonel Willard P. McCrone entitled *The Honolulu District and Pearl Harbor,* dated December 1949.

Another history of the Honolulu Engineer District when it was located at Fort Armstrong is Ellen van Hoften's *History of the Honolulu Engineer District, 1905–1965*, dated 30 June 1970.

A detailed narrative of the surveys for and construction of the air ferry routes, and other contract construction work by Leif Sverdrup, are found in Gregory M. Franzwa's *Legacy: The Sverdrup Story* published by the Patrice Press, St. Louis, in 1978. The continuation of the story of this civilian contractor who, while working for the Corps of Engineers, accepted a wartime commission and ended up on General MacArthur's staff is found in *Lief Sverdrup, Engineer Soldier at His Best* by the same author and press, 1980.

Reference to the Australian aviators' wheeled aircraft flights across the South Pacific and details of circa 1930s American and Hawaiian civilian occupation of some of the South Pacific islands are found in E.H. Bryan, Jr., *Panala'au Memoirs* published by the Pacific Scientific Information Center, Bernice P. Bishop Museum, Honolulu, 1974.