THE U.S. NAVY · 1941–1945

THE MACHINE THAT SANK JAPAN

How America Out-Built, Out-Supplied and Out-Thought the Imperial Navy



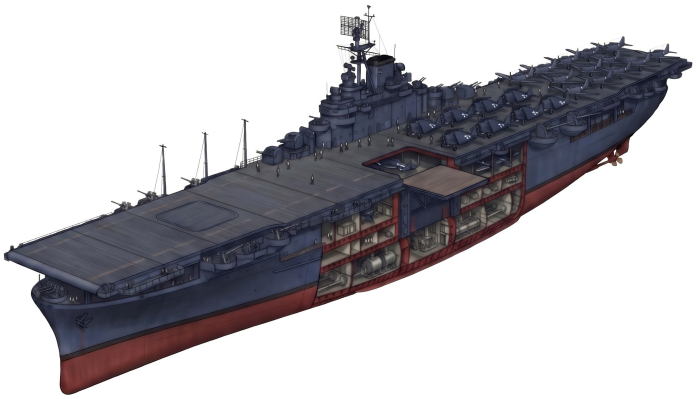
NAVAL HIGH COMMAND

FREE SAMPLE CHAPTER

THE MACHINE THAT SANK JAPAN

How America Out-Built, Out-Supplied and Out-Thought the Imperial Navy

This free sample is Chapter 7 of 12, complete and unabridged, with its illustrations, maps, charts and photographs exactly as they appear in the full book.



NAVAL HIGH COMMAND



"MURDERERS' ROW": THIRD FLEET CARRIERS AT ANCHOR IN ULITHI ATOLL, DECEMBER 8, 1944, BETWEEN OPERATIONS OFF THE PHILIPPINES. FROM FRONT: WASP (CV-18), YORKTOWN (CV-10), HORNET (CV-12), HANCOCK (CV-19), TICONDEROGA (CV-14). PHOTOGRAPHED FROM A TICONDEROGA PLANE. · U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-294131 (VIA NHHC)

7

THE FLEET THAT NEVER WENT HOME

How oilers, floating bases and a hose slung between two moving ships let the US Navy stay off Japan's coast for months.

▶ WATCH THE COMPANION VIDEO: JAPANESE ADMIRALS NEVER KNEW THE US FLEET COULD REARM WITHOUT RETURNING TO PORT

On October 15, 1944, in open water east of Formosa, the aircraft carrier *Intrepid* (CV-11) spent the day doing something her enemies believed she could not do. For three days the carriers of Task Force 38 had been hammering Formosa's airfields, and Japanese aircraft had struck back by day and night. Two American cruisers had been torpedoed and were crawling away under tow (Chapter 8). Radio Tokyo was claiming a great victory, and Japan announced that a force was on its way to destroy what was left of the American fleet. *Intrepid* was not fleeing. She was alongside the fleet oiler *Schuylkill* (AO-76), steaming in company at fueling speed with hoses slung across the gap between them.

She stayed there for 3 hours and 36 minutes. In that time she took aboard 9,543 barrels of fuel oil and 76,000 gallons of aviation gasoline, and from the escort carriers that steamed with the oilers she received five replacement fighters and 10 bombers. Her war diary recorded the fueling, the aircraft and one pointed sentence: "We are preparing to meet Japanese surface and carrier units who believe we are a fleeing crippled and disorganized fleet."

The man who ran the oilers was not a flag officer. Captain Jasper T. Acuff commanded the Third Fleet's at-sea logistic group, Task Group 30.8, from the destroyer *John D. Henley* (DD-553). That day he had himself hauled across the water in a boatswain's chair and trolley to the battleship *New Jersey* (BB-62) for a conference with Admiral William F. Halsey, and he was back aboard his destroyer 40 minutes later. Across October 15 and 16 his oilers issued 292,000 barrels of fuel oil and 726,000 gallons of aviation gasoline to the fast carriers.

Halsey sent Admiral Chester W. Nimitz a message that has been quoted ever since, here in the words his biographer E. B. Potter gives: "The Third Fleet's sunken and damaged ships have been salvaged and are retiring at high speed toward the enemy."

The joke worked because of the oilers. A fleet that had flown three days of strikes and fought off three days of air attack ought, by the habits of every navy before it, to have been heading for a base. It refueled where it stood and turned back toward the fight. The Japanese air commander on the other side saw the same thing. Vice Admiral Fukudome Shigeru, whose Second Air Fleet had made the counterattacks from Formosa and Kyūshū, told American interrogators in December 1945 that he had felt "considerable success had been attained" and so had "expected that some time would lapse before you would undertake the attack further south. However, your thrusts against the Philippines came much sooner than expected."

This book argues that the United States did not beat the Imperial Japanese Navy (IJN) only with better admirals or braver men. It beat Japan with a machine: shipyards, engines, training schools, construction battalions, codebreakers, repair docks and fire control, each ordinary on its own and some of them failures at first. This chapter is about the part of that machine nobody photographed for the newspapers: the oilers, ammunition ships, stores ships and floating bases that let the fleet live at sea. Without them, every other part would have had to stop every few weeks and go home.

FLEETS GO HOME

A warship is a machine for turning fuel into distance and speed, and carriers were among the hungriest. In Fleet Problem XVI in 1935, *Lexington* (CV-2) was critically low on fuel after five days. The next year *Saratoga* (CV-3) burned as much as 10 percent of her capacity in a single day of flight operations, and at 25 knots, her normal speed for launching in light winds, she consumed more than 30 tons of oil an hour. A carrier had to turn into the

wind to launch, race to rejoin the fleet, and turn into the wind again. Every turn cost oil.



The light carrier *Langley* (CVL-27) refueling at sea during the Philippines campaign, November 13, 1944. A destroyer approaches her stern to deliver mail; a second destroyer lies on the oiler's far side.

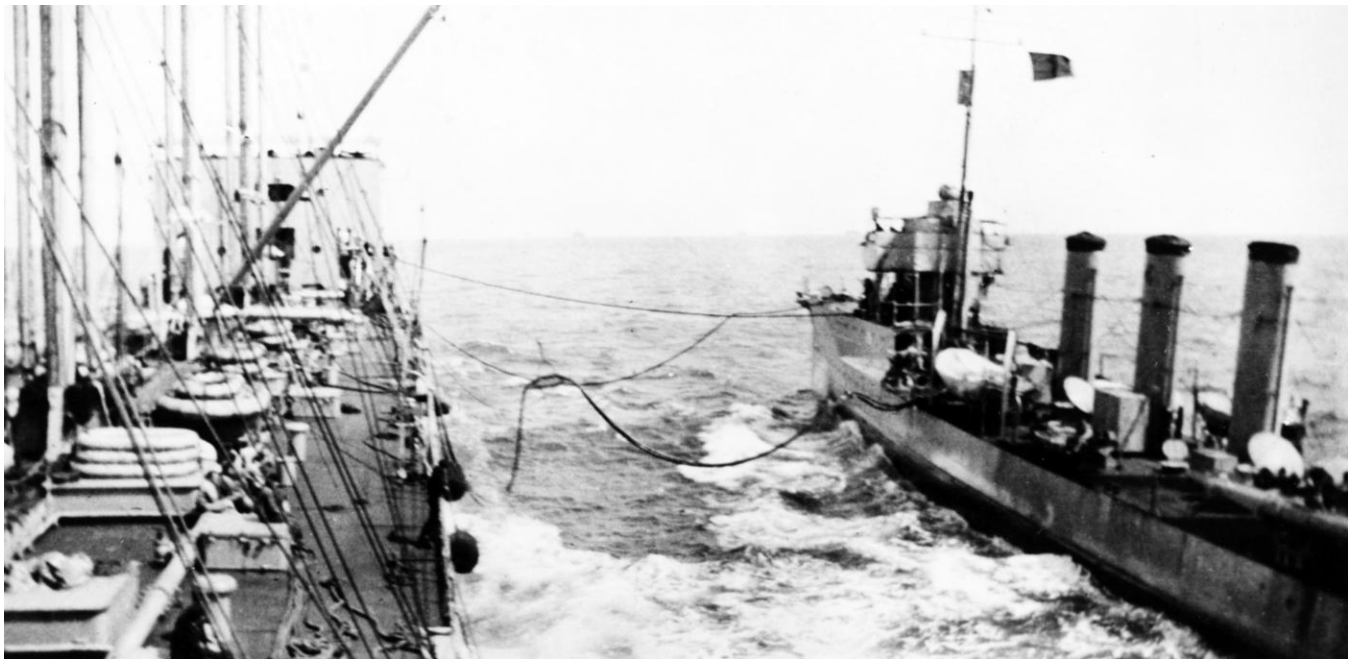
U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-270704 (VIA NHHC)

The old answer was the base: a harbor with tank farms, piers and a dockyard, where the fleet came in, filled up and went out again. The Pacific made that answer expensive. Ulithi Atoll, where this chapter's floating base did its greatest work, lies 3,643 nautical miles from Pearl Harbor and more than 5,400 nm from San Francisco. In 1940 the US Navy owned 14 oilers.

The idea that would solve the problem was older than the problem. In the spring of 1917 the Navy needed to get destroyers across the Atlantic to fight U-boats, and destroyers could not carry enough fuel to make the crossing. The fuel ship *Maumee* (Fuel Ship No. 14, later AO-2), built with diesel engines when diesels were still a novelty, was sent to a waiting position about 300 miles south of Greenland. Her executive officer and chief engineer was a lieutenant commander named Chester W. Nimitz, who had studied diesels in Germany and designed her engines. Her captain, Henry C. Dinger, was the Navy's leading authority on liquid fuels. Nimitz prepared the gear; he later gave Dinger the credit for the idea.

At 0556 (5:56 a.m.) on May 28, 1917, *Maumee*'s lookouts sighted the destroyers of Division 5. Nimitz remembered the method years afterward: the destroyer came alongside about 50 feet away, slowed to the oiler's speed of about 5 knots, and took a messenger line fired across by a line-throwing gun; then a 10-inch manila hawser, and the fuel ship towed the destroyer while oil ran through rubber hoses held clear of the sea in wooden saddles hung

from *Maumee*'s cargo booms. The ships rolled 10 to 20 degrees in a cross swell. Each destroyer took almost 20,000 gallons at about 32,000 gallons an hour, and the average time from approach to disconnect was 75 minutes. By early July *Maumee* had fueled most of the 34 destroyers bound for Europe (all of them, by Wildenberg's count), in roughly five weeks.



The destroyer *McCall* (Destroyer No. 28) takes fuel from *Maumee* in the Atlantic, September 22, 1917. Lines and a fuel hose span the gap between the ships, the same alongside principle the Navy used in 1945.

NAVAL HISTORY AND HERITAGE COMMAND NH 93098



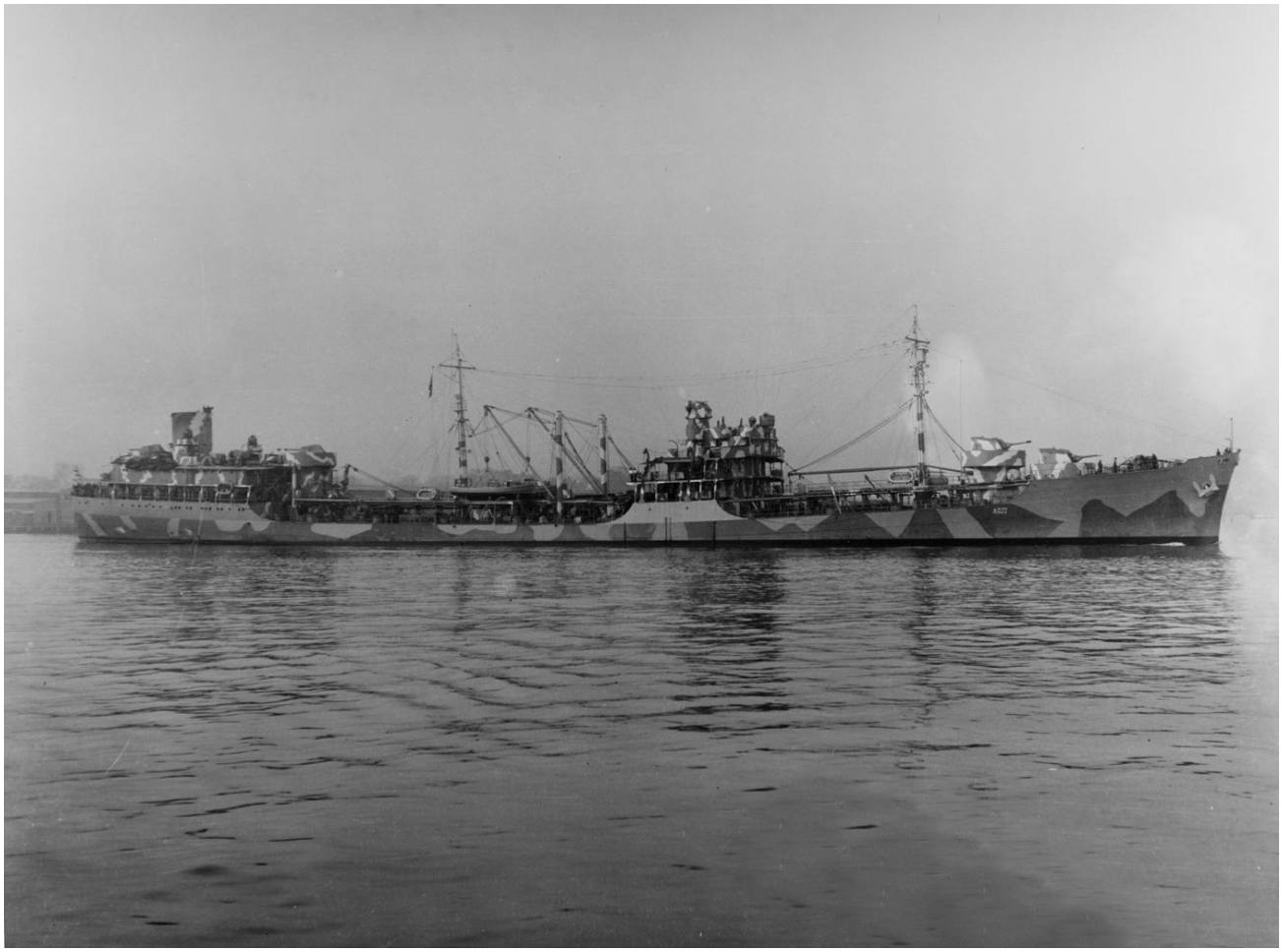
McCall approaches *Maumee* to refuel in an Atlantic gale, September 22, 1917.

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Then, for 20 years, the idea mostly slept. In January 1925 the oiler *Cuyama* (AO-3) fueled the light cruiser *Omaha* (CL-4) alongside in a flat calm at about 4 knots, passing 221,878 gallons. But the fleet's settled opinion held that bringing a big ship close beside an oiler at sea was too dangerous; heavy ships, if they fueled at sea at all, would trail astern on a long hose. In October 1938 the Chief of Naval Operations asked for tests, and the job of running them fell to the commander of Battleship Division 1, Rear Admiral Chester Nimitz. He recommended the alongside, or "broadside," method his old ship had used. On June 19–20, 1939, the oiler *Kanawha* (AO-1) and *Saratoga* steamed together off southern California, passed lines, and pumped fuel oil and gasoline into the carrier at about 7 knots for just over five hours. It worked.

The ships to make it routine were arriving almost by accident. The Maritime Commission, trying to rebuild a merchant fleet in which more than 90 percent of tankers made less than 12 knots, subsidized a class of fast commercial tankers, the "national defense" tankers, built to Navy speed requirements. The first, laid down for Standard Oil of New Jersey at Chester, Pennsylvania, on April 25, 1938, was bought by the Navy at the contract price and commissioned as *Cimarron* (AO-22). On her trials in February 1939 she made 19.28 knots fully loaded. She was 553 feet long and carried a little over 100,000 barrels of cargo oil. In the next six years *Cimarron* and 32 other

ships of her type, the T3 tankers, became the backbone of the fleet train.



Cimarron (AO-22), first of the fast fleet oilers, off Norfolk Navy Yard on February 6, 1942, in dazzle camouflage, weeks before she fueled the Doolittle raid force.

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 19-N-30121

ALMOST AS SCARCE AS CARRIERS

When the war came the fleet was not ready to live at sea, and the first weeks proved it. The Pacific Fleet's supply arm, Service Squadron 8, had been formed only in July 1941; by August it had 18 ships, 11 of them oilers. On December 7 one of the new ships, *Neosho* (AO-23), was tied up at the Ford Island fuel dock, having just discharged a cargo of aviation gasoline. Commander John S. Phillips had her mooring lines cut with fire axes and backed her out past the burning battleships without losing a man.

Two weeks later the relief force for Wake Island showed what an unpracticed fleet faced. The old oiler *Neches* (AO-5) could make no more than 12¾ knots. On December 22 and 23, in a long cross swell, she fueled eight destroyers in two long days alongside, four a day; her deck log records each approach, the start of pumping and the breakaway. By then it was too late to save the island, and the force was recalled. Whether faster fueling would have saved Wake is still argued. Thomas Wildenberg, the historian of the oiler force, thinks the delay may have saved *Saratoga* from a fight she was not ready for.

In January 1942 a Japanese submarine sank *Neches*, and a planned carrier raid on Wake was cancelled because, as Samuel Eliot Morison later put it, the force could not go without fueling at sea and there was no other tanker to spare. Captain Worrall R. Carter, who ran the fleet's float-

ing base later in the war and afterward wrote its history, put it plainly: in those months tankers were almost as scarce as carriers.

The new oilers made the early raids possible. On January 28, 1942, *Platte* (AO-24) fueled the *Enterprise* (CV-6) group from dawn until well into the night so that the carrier could make a high-speed run-in to the Marshalls; *Enterprise* came alongside after dark and lay there five and a half hours, with men standing by the connections with axes in case the ships had to break apart. In April *Cimarron* and *Sabine* (AO-25) took the Doolittle raid force most of the way to Japan, fueled it on April 17, the day before the launch, turned back, and met it again on the 21st. *Yorktown* (CV-5) stayed at sea from February 17 until she reached Tongatabu on April 20, 62 days, living on oilers.

The cost of depending on so few hulls came in the Coral Sea. On May 7, 1942, Japanese aircraft found *Neosho* and the destroyer *Sims* (DD-409) at a fueling rendezvous. *Sims* broke in two and sank. *Neosho* took seven hits and drifted for four days before the destroyer *Henley* (DD-391) took off 123 survivors and scuttled her. Carter later asked how long Rear Admiral Frank Jack Fletcher could have held the Coral Sea if the Japanese had not withdrawn: his base, Tongatabu, was 1,300 miles away.

THE OIL KING'S SCHEDULE

In 1942 an oiler was an escort the fleet dragged along. In 1943 the Navy turned oil into a scheduled service.

In March 1943 Captain August H. Gray, later a commodore and known in the fleet as the "Oil King of the Pacific," took command of Service Squadron 8. It then had 44 vessels, 27 of them fleet oilers, and the promise of 18 more tankers. Within a year it had some 430 ships assigned; by July 1945 it administered 365 commissioned ships and 388 barges, and its people had grown from about 5,000 men to more than 65,000. Behind it, the whole Service Force of the Pacific Fleet, commanded from early 1942 into 1945 by Vice Admiral William L. Calhoun, grew from 324 vessels in September 1943 to 2,930 ships by the end of July 1945.

The test came in the Gilbert Islands in November 1943. Pearl Harbor was some 2,100 nautical miles from Tarawa, and the nearest South Pacific base, Espiritu Santo, more than 1,000. Instead of sending ships back to fuel, the Navy refueled the whole invasion fleet at sea. A roving group of 13 fleet oilers, with a combined cargo of 1,326,332 barrels, worked in pairs and threes with destroyer escorts at rendezvous points that changed daily, fueling relays of warships at 8 to 12 knots. Carter recorded the change in a sentence: before, oilers had fueled task forces to stretch their radius for a strike; now "the time at sea was to be until the assignment or mission was completed."



The heavy cruiser *Northampton* (CA-26) in a rough sea during the Doolittle raid operation, April 1942. The original caption says she was refueling from *Cimarron*, out of the frame.

U.S. NAVY PHOTOGRAPH (VIA WIKIMEDIA COMMONS)



Vice Admiral William L. Calhoun (left), Commander Service Force, Pacific Fleet, with Vice Admirals John H. Towers, Robert L. Ghormley and Aubrey W. Fitch at Nimitz's headquarters, Pearl Harbor, November 14, 1943.

NAVAL HISTORY AND HERITAGE COMMAND NH 62432 (COLLECTION OF FLEET ADMIRAL CHESTER W. NIMITZ)

The technique got simpler as it got commoner. During the Gilberts, Captain Truman J. Hedding, chief of staff of a carrier division, watched an oiler maneuvering to come alongside a carrier and suggested the reverse: set the oiler steady on course and let every ship make its approach on her, as aviators flew formation. Rear Admiral Charles A. Pownall agreed to try it. It became doctrine.



Vice Admiral William L. Calhoun (left), Commander Service Force, Pacific Fleet, with Rear Admirals Frank Jack Fletcher, Thomas C. Kinkaid, William Ward Smith, Marc A. Mitscher and Robert H. English at an awards ceremony at Pearl Harbor, June 17, 1942.

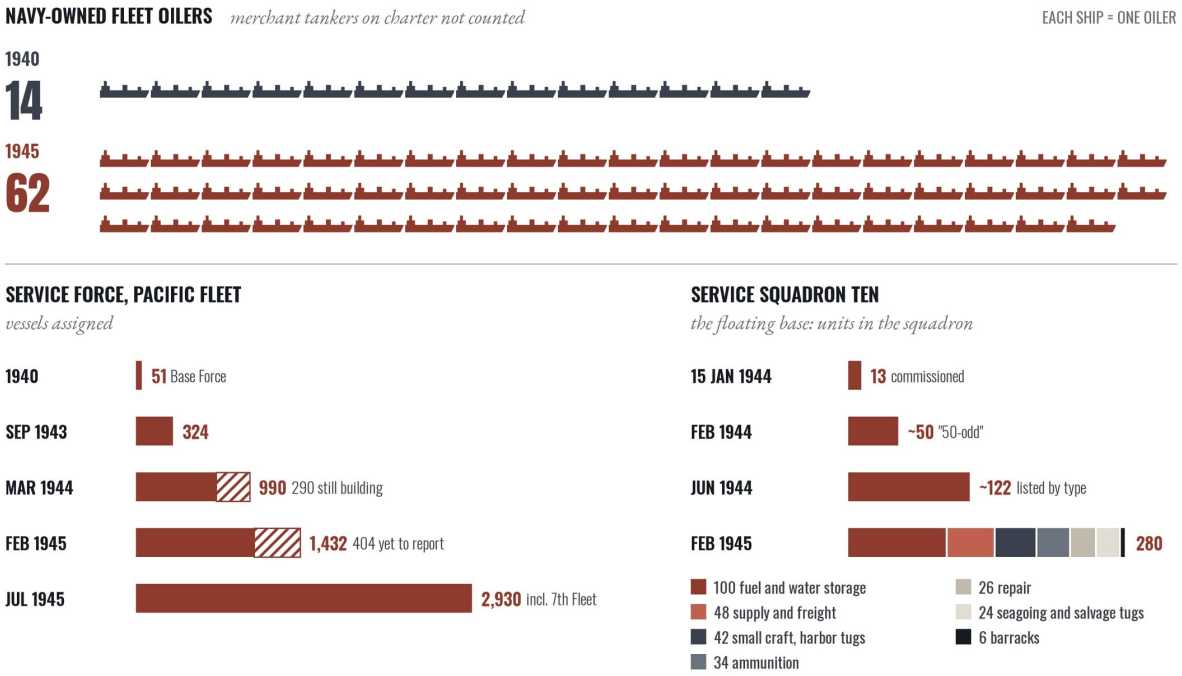
U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-10403 (VIA NHHC)

Behind the fleet oilers stood a chain. From the Marshalls onward, Carter wrote, the fleet oilers became distribution vessels; the long haul from California, and the longer one from the Caribbean through the Panama Canal, was made by "an endless chain of large commercial tankers," which discharged into the fleet oilers in forward anchorages. Refinery, merchant tanker, anchorage, fleet oiler, warship: that relay, more than any single ship, was the American achievement.

None of this had been planned in detail. Historians still argue over how much of the fleet train the prewar planners foresaw; Carter, who was there, wrote that no one in those early days knew enough about fleet logistics to make good estimates of what the war would demand. The Navy had gone to war with 14 oilers. It learned by doing.

THE FLEET BEHIND THE FLEET

The oilers, supply ships, tenders and tugs that kept the Pacific Fleet at sea, 1940–45



Source: Worrall R. Carter, Beans, Bullets, and Black Oil (Department of the Navy, 1953): oilers p. 5; Base Force 1940 and Service Force growth p. 9 (hatched = assigned but still building or yet to report; July 1945 includes Service Force Seventh Fleet); Service Squadron Ten pp. 106–07 (commissioned 15 Jan 1944), 136 (June 1944 list, by type), 303 ("50-odd" in Feb 1944; 280 units in mid-February 1945).

■ Growth of the service fleet. Service Force, Pacific Fleet: 324 vessels (September 1943), 990 assigned (March 1944), 1,432 (February 1945), 2,930 (July 1945). Navy oilers: 14 in 1940, 62 in 1945. Source: Carter, Beans, Bullets, and Black Oil, pp. 5, 9.

CHART: NAVAL HIGH COMMAND, FROM CARTER, BEANS, BULLETS, AND BLACK OIL (1953)

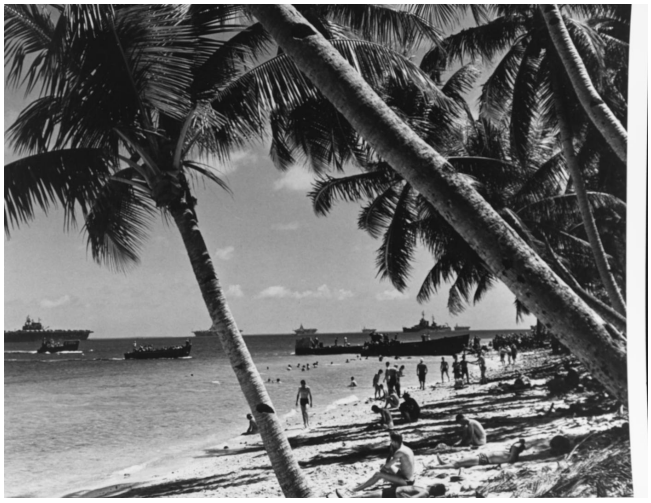
A BASE THAT FLOATED

Oil was only part of what a fleet consumed. Ships needed food, ammunition, spare parts, fresh water, mail, repairs and, now and then, a place for their crews to stand on sand. In the South Pacific these came from shore bases on big islands. The Central Pacific offered lagoons, superb anchorages ringed by islets too small to hold a navy yard. In the fall of 1943 Nimitz ordered the Service Force to organize two mobile service squadrons that would leapfrog each other across the ocean behind the fleet. The leapfrogging never happened. What happened instead was stranger.

Service Squadron 4 went to Funafuti in the Ellice Islands in November 1943 with the destroyer tender *Cascade* (AD-16) and 23 other vessels. Service Squadron 10 was commissioned at Pearl Harbor on January 15, 1944, with exactly 13 hulls: one destroyer tender, one large repair ship, one survey ship, two ocean tugs, one harbor tug and seven 500-ton barges. Its mission statement called it "a mobile base."

Its commander was a captain serving, that winter, as a convoy commodore. When Vice Admiral Raymond A. Spruance found Worrall Carter at newly captured Majuro Atoll in the Marshalls, he told him, as he later wrote, to find a relief for his convoy billet and start building Service Squadron 10 where he stood. The fast carriers had entered Majuro's lagoon on February 4, 1944. Carter's flagship, the destroyer tender *Prairie* (AD-15), arrived with a staff of 16 officers. A survey ship charted the lagoon and

numbered the berths, and the first floating drydock to reach the Central Pacific docked a destroyer eight days after it arrived. By June 1944 the squadron had 4 destroyer tenders, 6 repair ships, 6 floating drydocks, 15 old tankers used for storage and local fueling, 23 oil and gasoline barges, 13 ammunition barges, 6 concrete supply barges and 15 tugs, among much else.



Sailors at the fleet recreation beach, Majuro Atoll, Marshall Islands, 1944. In the lagoon behind them lie carriers of the fleet that Service Squadron 10 supplied.

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-373579 (VIA NHHC)

Then the base moved. Carter was at Eniwetok, 591 nm farther west, from June 5, 1944. In the first half of July an average of 488 ships a day lay in the lagoon, and between July 7 and 12 more than 520.

The oilers worked outward from these lagoons. For the invasion of the Marianas in June 1944, the at-sea fueling group, Task Group 50.17 under Captain Edward E. Paré in *John D. Henley*, was organized into eight units of three oilers, each with its own escorts; Carter counted 24 oilers, Wildenberg 20. Planners expected the forces involved to need about 100,000 barrels of fuel a day, and commercial tankers were to deliver about 1,400,000 barrels to the forward bases every two weeks. Eleven fueling areas were laid out west of the islands, rectangles 75 miles long and 25 miles wide, each named after a well-known oil company. On June 18 Japanese bombers found three oilers fueling escorts and hit all three, the first air attack on American oilers in the Central Pacific; *Saranac* (AO-74) lost 8 killed and 22 wounded.

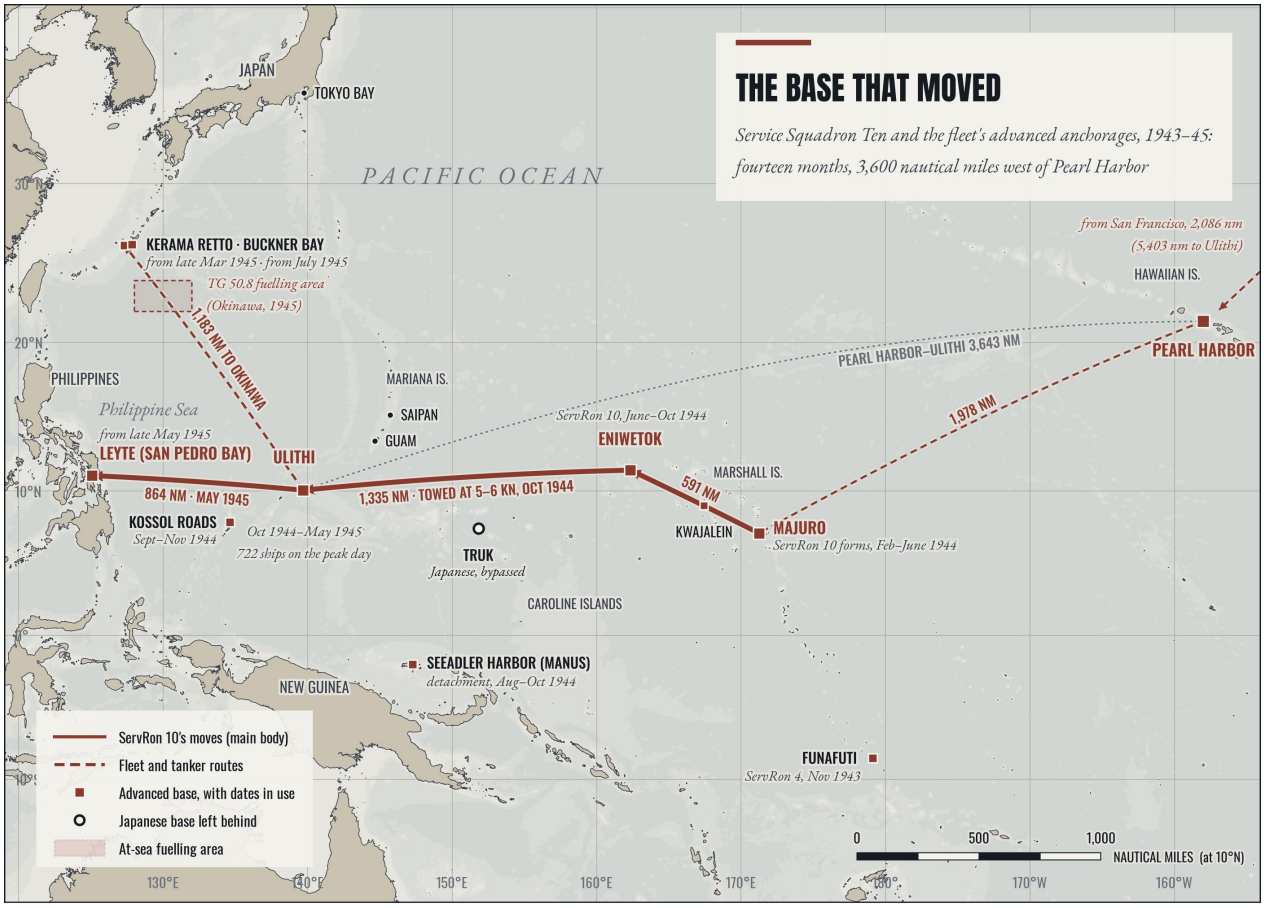
In September a detachment under Captain Samuel Ogden ran a second advanced base at Seeadler Harbor in the Admiralties, where 4,150,000 barrels of fuel oil were to be delivered in a single month. In October the main body moved to Ulithi, and it went under tow. The first convoy left Eniwetok on October 4: repair ships towing concrete stores barges, old station tankers, oil and gasoline barges and ammunition lighters, 25 units in all, making about 5 knots. Tows parted and were remade in the dark; a barge was found with 2 feet of water in her and was pumped out at sea. A second convoy followed, and on October 12 a third, 35 units including three floating drydocks, each entrusted only to a fleet tug. All reached Ulithi between October 14 and 21 without the loss of a man or a barge. Nobody attacked them.

> *"Exactly why the enemy allowed all that equipment to proceed nearly 1,400 miles at an average of less than 6 knots may never be known."*
>
> REAR ADMIRAL WORRALL R. CARTER, BEANS, BULLETS, AND BLACK OIL (1953)

Ulithi is the largest atoll in the western Carolines, about 30 low islands strung around a lagoon 19 miles from north to south and 5 to 10 miles wide, roughly midway between Guam and Palau. The Japanese had left it. American minesweepers began work on September 21, 1944, and a reconnaissance platoon landed the next day without opposition. The carriers of two task groups came in on October 1 and 2, before Carter's ships, and two days later rode out a typhoon at sea; the lagoon was a good anchorage and a poor storm shelter.

Because the Navy did not mean to keep Ulithi after the war, it built no permanent tank farm there. Obsolete tankers anchored in the lagoon served as a floating one, and commercial tankers from California and the Caribbean pumped into them. The move added about 2,800 miles to each tanker's round trip, and the stockpile afloat was the insurance. Fleet oilers came in from sea, filled from the station tankers or straight from the merchant

ships, and went out again. The lagoon was so big that a flagship in the northern anchorage lay some 20 miles from ships in the southern one, and 12 berths in between were set aside for relay ships that passed visual signals along. On a single day in November, three merchant tankers arrived with 100,000, 103,000 and 100,000 barrels, and two fleet oilers with standard cargoes of 90,000 barrels of fuel oil, 8,000 barrels of diesel and 400,000 gallons of aviation gasoline. In February 1945 alone, Service Squadron 10's ships in all its ports issued 4,100,000 barrels of fuel oil, 33,775,000 gallons of aviation gasoline, about 28,000 tons of ammunition and some 14,500 tons of provisions, and docked 52 vessels in floating drydocks. By then the squadron had 280 units, grown from the 50-odd it had begun with a year earlier.



Land: Natural Earth. Bases and dates: W. R. Carter, Beans, Bullets, and Black Oil (1953), pp. 95–371; TG 50.8 area: Wildenberg, Gray Steel and Black Oil (1996), p. 200. Distances: great-circle nautical miles computed from the base coordinates (ch07 research table). Routes are drawn as great circles, not as the tracks actually steamed.

■ The base that moved, 1943–45: Funafuti, Majuro, Eniwetok, Seeadler Harbor, Ulithi, Leyte, Kerama Retto. Great-circle distances: Pearl Harbor–Majuro 1,978 nm; Majuro–Eniwetok 591; Eniwetok–Ulithi 1,335; Ulithi–Leyte 864; Ulithi–Okinawa 1,183.

MAP: NAVAL HIGH COMMAND. LAND: NATURAL EARTH

For the crews, Ulithi meant Mogmog. Seabees cleared a recreation area on the northern islet from October 15; by January 1945 it could take 8,000 men and 1,000 officers a day, with ball fields, a bandstand and a 1,200-seat theater. The ration was three bottles of beer per man, as the captain of *North Carolina* (BB-55) noted, along with a swim and a sunburn. It was not much. Vice Admiral Marc A. Mitscher warned in his report on the autumn's operations that probably 10,000 men in his task force had not set foot ashore in more than ten months.



Task Group 38.3 enters Ulithi in column on December 2, 1944, back from strikes in the Philippines: the light carrier *Langley* (CVL-27) leads *Ticonderoga* (CV-14) and the battleships *Washington* (BB-56) and *North Carolina* (BB-55).

U.S. NAVY PHOTOGRAPH (VIA WIKIMEDIA COMMONS)

SOURCES DIFFER

Sept. 20-23

Ulithi's occupation is dated September 20 (*Building the Navy's Bases*), September 21–22 (minesweeping, then the first landing, in Carter) and September 23 (most later accounts). All agree it was unopposed.

The Japanese did find the anchorage. At 0547 on November 20, 1944, a kaiten, a manned torpedo launched from the submarine *I-47*, hit the fleet oiler *Mississinewa* (AO-59) at berth 131. She had filled her tanks four days earlier, almost to capacity, with about 90,000 barrels of fuel oil, 9,000 barrels of diesel and 404,000 gallons of aviation gasoline. Flames rose more than 100 feet; she rolled over and sank at about 0900. Directed by radio from *Prairie*, tugs went in to the edge of the burning oil for survivors, and a floatplane pilot taxied through the flames trailing a line for swimmers to grab. The Navy's ship history counts 60 of her crew lost; other accounts give 63. Carter, as senior officer present, weighed the risk of more midget craft against the work waiting to be done, and shortly after noon ordered routine logistic operations resumed. The base kept working.

They came again by air. On the balmy evening of March 11, 1945, the crew of Carter's new flagship, the barracks ship *Ocelot* (IX-110), were watching a movie on the forecastle; the short before the feature was a sing-along, and they were singing "Red River Valley" when a twin-engined plane roared over at masthead height. Men cursed what they took for an Army pilot showing off. Then came the explosion on the carrier *Randolph* (CV-15), another on nearby Sorlen islet, and the general alarm. *Randolph* lost 26 killed and 3 missing, with 105

wounded. Two days later 647 ships lay at anchor in the lagoon, and on the peak day, as the invasion force for Okinawa staged through, Carter counted 722.



Hancock (CV-19) and *Wasp* (CV-18) at anchor in Ulithi lagoon, about mid-March 1945, the month when 647 and then 722 ships lay inside the reef.

U.S. NAVY PHOTOGRAPH (VIA WIKIMEDIA COMMONS)



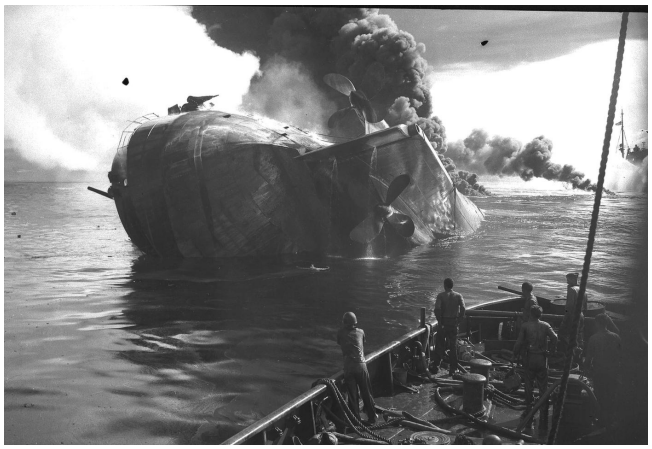
The new *Cimarron*-class oiler *Mississinewa* (AO-59) off Hampton Roads, May 25, 1944: kingposts and fueling booms along the well decks, spar decks above them, the bridge amidships. Six months later she was sunk at Ulithi.

NAVAL HISTORY AND HERITAGE COMMAND NH 97279



The oiler *Mississinewa* (AO-59) burning and sinking at Ulithi, November 20, 1944, after a Japanese kaiten human torpedo struck her. A light carrier lies at anchor in the foreground.

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-270753 (VIA NHHC)



Believed to show *Mississinewa* capsized and burning at Ulithi on November 20, 1944, watched from a small craft in the foreground.

PHOTOGRAPH VIA WIKIMEDIA COMMONS (SOURCE TO BE TRACED)



A destroyer escort drops depth charges inside Ulithi anchorage on November 20, 1944, hunting for submarines after the sinking of *Mississinewa*, as a *Fletcher*-class destroyer steams past. Photographed from *Bunker Hill* (CV-17).

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-270650 (VIA NHHC)



Islands: GSHHG 2.3.7 (full resolution); reefs and names: OpenStreetMap contributors (ODbL). Anchorages, channel and figures: W. R. Carter, Beans, Bullets, and Black Oil (1953), pp. 223–224, 261, 277–278, 325–326 (channel position approximate, after Carter's chart p. 223); Building the Navy's Bases, vol. II, p. 334. Distances: great-circle nautical miles, computed.

■ Ulithi Atoll, 1944–45: the lagoon, Mugai Channel, the northern anchorage off Mogmog and Sorlen, the southern anchorage off Fassarai, and Falalop airstrip. On the peak day in March 1945, 722 ships lay inside the reef.

MAP: NAVAL HIGH COMMAND. ISLANDS: GSHHG; REEFS: OPENSTREETMAP CONTRIBUTORS (ODBL)



Ulithi in March 1945, as the fleet gathered for Okinawa. The destroyer-minelayer *Shannon* (DM-25) crosses the lagoon; cruisers and a line of carriers lie anchored beyond.

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-K-3816

A DAY ALONGSIDE

The fleet did not go to Ulithi to fuel. It went there to rearm, repair and rest; it fueled at sea, every three or four days, from oilers that came out to meet it. By 1944 the procedure had become a drill, and in November the headquarters of the Commander in Chief, US Fleet, published it as a book of instructions, meant as a guide for crews to whom the exercise was unfamiliar.

The night before a fueling rendezvous, the commander of the oiler group studied the wind, the weather and the sea and chose a course and speed for the morning, normally into the wind at about 10 knots. He timed his approach to meet the task group an hour or two before dawn. At first light three or four oilers formed a line abreast, 1,500 to 2,000 yards apart. When ammunition ships and stores ships came out too, they formed a second line 2,000 yards astern. Then the warships came to them.

A carrier always came up on the oiler's port side, so that her island, on her starboard side, looked straight across at the oiler's bridge and both conning officers could see each other. A destroyer could take the other side at the same time. The 1944 instructions put the ships 40 to 80 feet apart; Wildenberg gives the usual gap as 20 to 70 feet, opening and closing as the hulls rolled and the helmsmen worked. A line-throwing gun sent over a shot line, then messengers, a marked distance line and a telephone line between the bridges. Then the hose came across.

It was not one hose but an assembly: 210 feet of 6-inch rubber hose, made up of 50-foot collapsible lengths and 20-foot heavy-duty lengths, carried in two saddles hung from booms on the oiler's kingposts. For a destroyer the last length was 4-inch hose, lighter to handle. Winchmen on both ships worked the bight lines continuously, raising and lowering the saddles so that the hose sagged in a shallow curve, clear of the water and never stretched taut. A carrier often took two fuel-oil hoses and a gasoline hose at once. At each connection men stood by with axes, ready to cut everything away if a ship sheered off or an enemy appeared.

THROUGH ENEMY EYES

How the other side saw the American machine

ENEMY VIEW · JAPAN

"The enemy carrier-borne air strength has sustained considerable loss in actions since the 11th, and they are being replenished from converted carriers. Due to refueling, etc., however, their replenishment might be interrupted, thus offering the best chance for us to get them."

The chief of staff of Japan's Combined Fleet, telegraphing the Mobile Fleet about the American carriers off the Marianas, three days before the Battle of the Philippine Sea

Wartime telegram, 1850, June 16, 1944, copied into Vice Admiral Ugaki Matome's diary (entry of June 17; English translation 1991)

MATOME UGAKI, FADING VICTORY: THE DIARY OF ADMIRAL MATOME UGAKI, 1941–1945, TRANS. MASATAKA CHIHAYA, ED. DONALD M. GOLDSTEIN AND KATHERINE V. DILLON (PITTSBURGH: UNIVERSITY OF PITTSBURGH PRESS, 1991), P. 404

ENEMY VIEW · JAPAN

"It was a great disappointment indeed to learn that the number of carriers in the atoll had rather increased, and there was no busy traffic of small craft or any sign of sunken vessels ... It turned out to be a complete failure."

Vice Admiral Ugaki Matome, commander of the Fifth Air Fleet, whose bombers had raided the Ulithi anchorage the night before, reading a reconnaissance report from Truk

Wartime diary, entry of March 12, 1945 (English translation 1991)

MATOME UGAKI, FADING VICTORY: THE DIARY OF ADMIRAL MATOME UGAKI, 1941–1945 (PITTSBURGH: UNIVERSITY OF PITTSBURGH PRESS, 1991), P. 550

WHY IT MATTERS Japan's fleet command knew the fleet replenished at sea and hoped to catch it refueling; after Ugaki's 1945 raid on its floating base, a scout found more carriers, not fewer.

A big ship took hours. In September 1944 the fueling of a whole carrier task group took between 6 hours 11 minutes and 7 hours 41 minutes, at 10 to 12 knots; destroyers were topped off from the heavy ships at up to 17 knots between tanker fuelings. Vice Admiral John S. McCain reported that all the tanker fuelings in that period went smoothly. Not all did. Hoses parted in heavy swells, and ships collided; *Kaskaskia* (AO-27) once had every boom on her port side carried away when a carrier sideswiped her. Halsey recommended that two battleships be fueled from one tanker at once only in an emergency, because of the risk of crushing the tanker between them.

There was a better rig in the making. In December 1944 the *Cimarron*-class oiler *Kaskaskia* and the destroyer *Hart* (DD-594) spent two weeks testing a method suggested by one of *Cimarron*'s officers: a ⅞-inch wire stretched between the ships, with trolleys running along it to carry the hose, allowing them to fuel 60 to 180 feet apart. They fueled some 50 times in every kind of sea. The span wire pointed to the future. In 1944 and 1945 it was an experiment; the fleet that crossed the Pacific fueled by the close-in method.

The oilers carried far more than oil. An oiler on the line passed over drums of lubricating oil, aircraft drop tanks, depth charges, mail, patients and passengers, as many as 50 a day from one ship; they even moved Japanese prisoners of war. Behind the oilers came the escort carriers that brought new aircraft and pilots. In the Marianas in July 1944 *Copahee* (CVE-12) launched 26 fighters, 7 torpedo bombers and 10 SB2C dive bombers to six fast carriers in a single day. The flyers came across under their own power; the carriers they had left were back in the fight.

Ammunition was harder. Fuel could be pumped; bombs had to be swung across in nets between two rolling ships. Some small trials were made in September 1944, but the first operational transfer came on February 23, 1945, off Iwo Jima. The ammunition ship *Shasta* (AE-6), after a test with *Wrangell* (AE-12) four days earlier, passed bombs to the carrier *Bennington* (CV-20) by a method worked out on Spruance's staff under Captain

Burton B. Biggs and known as the Burton method ("burton" was also an old sailor's name for a cargo tackle): a whip from each ship joined at a single hook, the load lifted, hauled across and lowered onto the carrier's hangar deck while the two ships steamed about 80 feet apart at 8 to 10 knots. *Shasta* gave *Hornet* (CV-12) 64,000 pounds of bombs in two hours.



Worrall R. Carter as a young officer, about 1917–20, in service dress blue. A quarter-century later he built and commanded Service Squadron 10 (February 1944–July 1945).

NAVAL HISTORY AND HERITAGE COMMAND NH 51567

THE MAN BEHIND IT

WORRALL REED CARTER

Worrall Reed Carter is recorded as having been born at sea on January 11, 1885, aboard the sailing ship *Storm King*. He graduated from the Naval Academy in 1908, commanded early submarines, and in World War I served on Vice Admiral William S. Sims's staff as a specialist in submarine-detection devices. Between the wars came the usual alternation of sea and shore: destroyers, a survey ship, the light cruiser *Marblehead* (CL-12), the naval station at Guantánamo Bay. In December 1941 he was chief of staff to the commander of the Pacific Fleet's battleships.

He had run bases, and that set his war. In the fall of 1942 he went to the South Pacific as Commander Naval Bases, then to the Aleutians, then back to Pearl Harbor, where he worked out on paper what a mobile service squadron would need. His estimate, about 80 units, was scoffed at; he was told he was dreaming. By February 1945 he commanded 280. Spruance, who gave him the job at Majuro, wrote that "Nick" Carter ran Service Squadron 10 from February 1944 to July 1945 and "did a magnificent job, often under great difficulties." He was promoted commodore in June 1944.

He had the temper for it. When a supply officer complained that the fleet had asked for everything except silk hats and evening dress, Carter answered that if more than one request for silk hats came in, it would be his duty to start doing something about it. Halsey's New Year's message to the squadron in 1945 named the stock in trade: beans, bullets, black oil, bulk stores, "and even bulkheads."

Shortly before the war ended Carter was ordered home for a medical survey, Spruance wrote, "over the vehement protests of Admiral Nimitz." He was found fit and asked to go back; the war ended first. In retirement, as a rear admiral, he wrote the Navy's history of logistics afloat, *Beans, Bullets, and Black Oil* (1953), the book on which much of this chapter rests. He died in 1975.

The limits mattered. Only one large ship could be rearmed at a time from one ammunition ship, and in the Okinawa campaign only the fast carrier groups took ammunition at sea. Battleships and cruisers firing in support of the troops, and the escort carriers, rearmed in the anchorage at Kerama Retto, where in seven weeks 1,137 ships were fueled and 610 ammunition replenishments totaling 37,915.6 tons were made. Rearming at sea was real by 1945, but it was new, partial and slow.

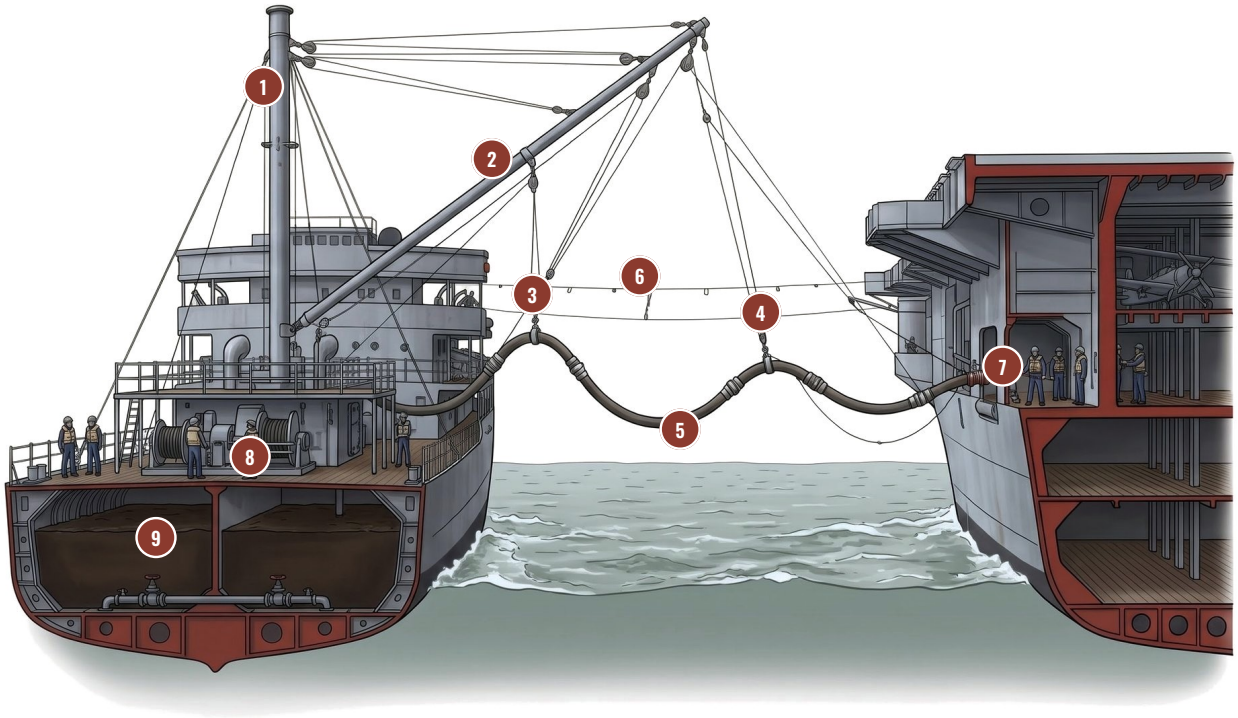


ILLUSTRATION The close-in fueling rig, 1944–45: a 6-inch hose carried in two saddles from the oiler's boom, with bight lines, easing-out line and saddle falls tended from the oiler's fueling winches. Schematic: the gap between the ships and the hose's thickness are not to scale.

1. Kingpost
2. Fuelling boom
3. Inboard saddle on its whip
4. Outboard saddle
5. 6-inch hose: collapsible and heavy-duty sections
6. Distance line and telephone line
7. Receiving connection at the carrier's hangar deck
8. Fuelling winches and manifold
9. Cargo oil tanks

ILLUSTRATION: NAVAL HIGH COMMAND (AI-ASSISTED, AFTER COMINCH P-2 (NOV 1944) AS SUMMARISED IN WILDENBERG, GRAY STEEL AND BLACK OIL, PP. 191-195)



The repair ship *Ajax* (AR-6) alongside the *Cimarron*-class oiler *Guadalupe* (AO-32) at Ulithi, February 9, 1945. *Guadalupe*'s bow had been smashed in a collision with the oiler *Nantahala* (AO-60) on the night of January 9–10.

U.S. NAVY PHOTOGRAPH (VIA WIKIMEDIA COMMONS)



Kaskaskia (AO-27) and *Hart* (DD-594) fueling at sea, December 23, 1944, photographed from a blimp. This was one of the experimental refuelings of December 12–23 that developed the span-wire rig.

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-294654 (VIA NHHC)

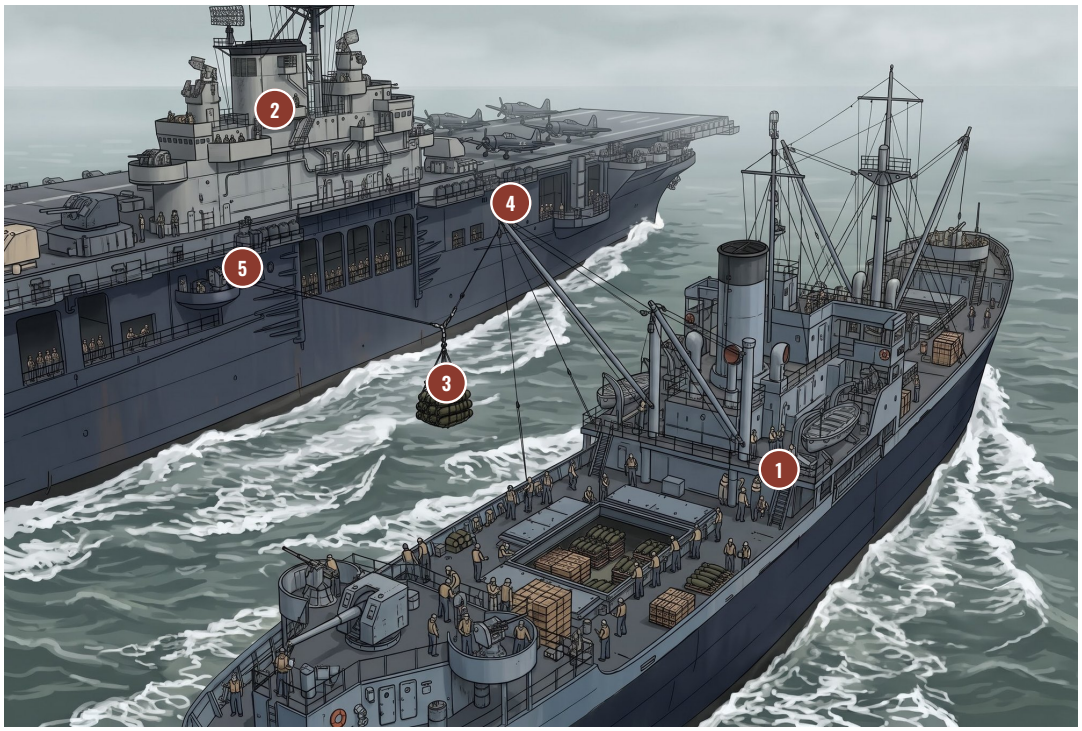


ILLUSTRATION The ammunition ship *Shasta* (AE-6) passes a net-load of bombs by the Burton method to an *Essex*-class carrier, about 80 feet apart at 8 to 10 knots, February 1945.

1. Shasta (AE-6)
2. Essex-class carrier
3. Load of bombs in a cargo net
4. Whip from Shasta's cargo boom
5. Whip to the carrier's hangar-deck opening

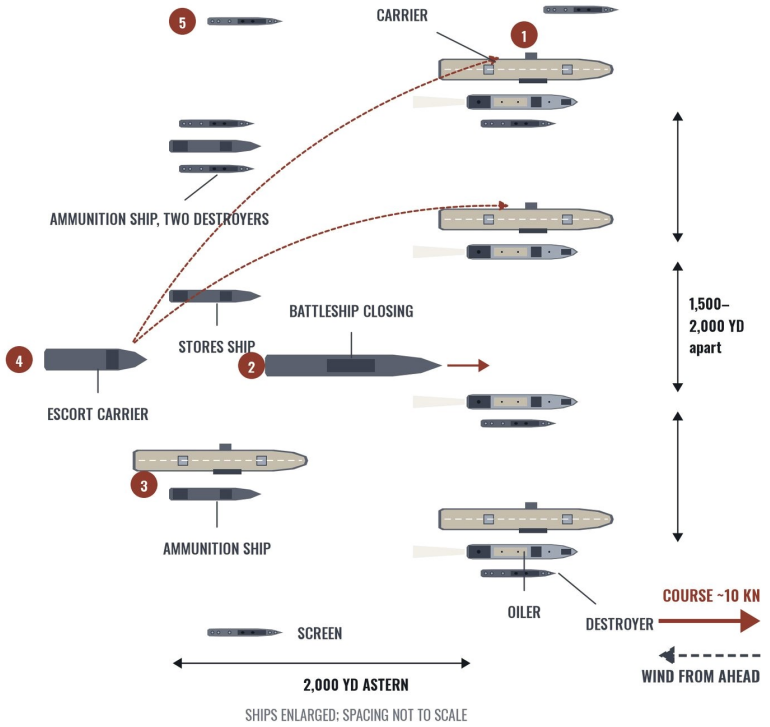
ILLUSTRATION: NAVAL HIGH COMMAND (AI-ASSISTED, AFTER CARTER, BEANS, BULLETS AND BLACK OIL, PP. 155, 285, AND NHHC NH 53254)

REPLENISHMENT DAY

One fuelling unit of the logistic group off Okinawa, 1945: the fast carriers' task groups came to it, filled up and went back to the fight

1. **THE OILERS**
   Three or four oilers in line abreast, 1,500–2,000 yards apart, steaming at about 10 knots into the wind.
2. **COME ALONGSIDE**
   Carriers and battleships take an oiler's port side; destroyers go to starboard or fuel from the big ships.
3. **AMMUNITION AND STORES**
   2,000 yards astern. Ammunition goes across by Burton whips, ~80 ft apart at 8–10 knots: one big ship at a time, or two destroyers. First done 23 Feb 1945.
4. **REPLACEMENT AIRCRAFT**
   Escort carriers fly new aircraft to the fast carriers; "every aviation item except wings" could be delivered at sea.
5. **THE SCREEN**
   Destroyers and tugs on the flanks.

A whole logistic group could spread up to about 100 ships over a 40-mile front. On 21–22 July 1945 it passed 379,157 barrels of fuel oil, 6,369 tons of ammunition, 99 aircraft and 412 men to the fleet off Japan.



Sources: Carter, Beans, Bullets, and Black Oil (1953), pp. 355–57, 363–64; Wildenberg, Gray Steel and Black Oil (1996), pp. 200–07; NHHC H-Gram 053-1 (21–22 July 1945). Schematic: ships enlarged and spacing not to scale; ammunition, stores and escort-carrier silhouettes generic.

■ A replenishment day, 1945: oilers in a line 1,500–2,000 yards apart steaming into the wind at about 10 knots; ammunition and stores ships 2,000 yards astern; carriers approaching the oilers to port, destroyers to starboard.

DIAGRAM: NAVAL HIGH COMMAND, AFTER CARTER (1953) AND WILDENBERG (1996)

BY THE NUMBERS

THE FLEET THAT STAYED, 1944-45

14 → 62
US Navy oilers, 1940 to 1945

280
units in Service Squadron 10 by February 1945, from 50-odd

722
ships at anchor in Ulithi lagoon on the peak day, March 1945

13 of 16
weeks the fast carriers spent at sea, October 1944–January 1945

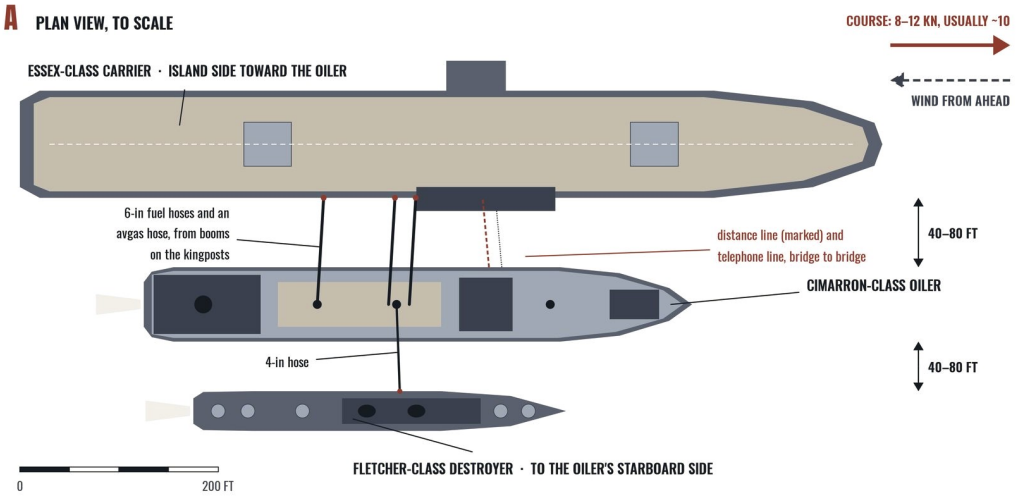
8,745,000
barrels of fuel oil issued at sea, March 17–May 27, 1945

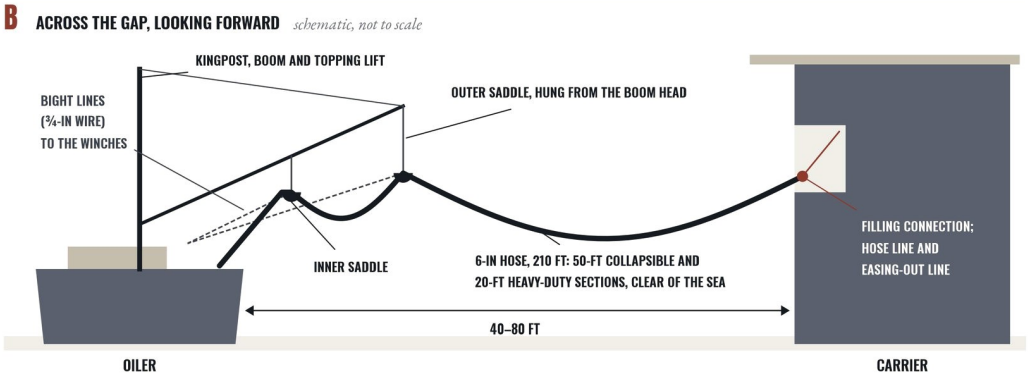
80,000
tons of tankers Toyoda could obtain for the Combined Fleet, 1944

SOURCES: CARTER, BEANS, BULLETS, AND BLACK OIL, PP. 5, 303, 325, 361; WILDENBERG, GRAY STEEL AND BLACK OIL, PP. 189, 203; USSBS INTERROGATION NAV. 75, P. 316

FUELLING ALONGSIDE

The close-in rig of 1944–45: an oiler feeding a carrier to port and a destroyer to starboard, all three steaming into the wind





C THE SEQUENCE

1 STEADY
The oiler holds the fuelling course at 8–12 knots, usually about 10, into the wind.

2 COME ALONGSIDE
The receiver closes from astern and holds station 40–80 ft abeam; carriers always to the oiler's port side, so the two bridges can see each other.

3 PASS THE LINES
A line-throwing gun fires the shot line; then the messenger, the distance line and the telephone line.

4 SEND THE HOSE
The hose line hauls the 6-in hose across on its two saddles (4-in hose for destroyers).

5 PUMP
Hose coupled, pumps start. Carriers take aviation gasoline at the same time as fuel oil.

6 TEND
Winchmen work the bight lines to keep the hose clear of the sea as the gap opens and closes.

7 BREAK AWAY
Pumps stop, the hose is drained and hauled back. Men with axes stand by to cut everything in an emergency.

HOW LONG
Intrepid, 15 Oct 1944: 3 h 36 min alongside Schuylkill. A task group's fuellings, Sept 1944: 6 h 11 min to 7 h 41 min at 10–12 knots; destroyers topped off at up to 17 knots.

Sources: COMINCH P-2, Fueling at Sea Instructions (Nov 1944), as summarized in Wildenberg, Gray Steel and Black Oil (1996), pp. 173–74, 182–83, 191–95, 206; Carter, Beans, Bullets, and Black Oil (1953), pp. 193, 213, 355–57. Plan view drawn to scale from ship dimensions (Essex-class flight deck 862 × 108 ft; Cimarron-class oiler 553 × 75 ft; Fletcher-class destroyer 376 × 40 ft); hose and line positions are schematic. The span-wire rig was still experimental in December 1944 and is not shown.

■ Fueling alongside, step by step: approach from astern; shot line, messengers, distance and telephone lines; hose hauled across on its saddles; pumping while winchmen tend the bight lines; breakaway.

DIAGRAM: NAVAL HIGH COMMAND, AFTER COMINCH P-2 (1944) VIA WILDENBERG, AND CARTER (1953)

ILLUSTRATION

THREE SHIPS, ONE SEA



ILLUSTRATION A *Cimarron*-class fleet oiler of the Third Fleet's logistic group fuels the carrier *Wasp* (CV-18), in Camouflage Measure 33, Design 10a, to port and a *Fletcher*-class destroyer to starboard, late 1944. Close-in rig, about 10 knots into the wind; representative scene.

1. Wasp (CV-18): island amidships, facing the oiler
2. Cimarron-class oiler
3. Fletcher-class destroyer
4. 6-inch hoses on saddles to the carrier, about 70 ft
5. Hoses to the destroyer, about 50 ft

ILLUSTRATION: NAVAL HIGH COMMAND (AI-ASSISTED, CHECKED AGAINST NHHC 80-G-294131, NH 97279 AND 80-G-K-6112)

WHAT JAPAN DID INSTEAD

THE FLEET THAT WENT TO THE OIL

It would be easy, and wrong, to say that Japan did not know how to refuel at sea. In November 1941 the Pearl Harbor striking force crossed the North Pacific on the strength of it. The operations order of November 23 assigned eight requisitioned merchant tankers in two supply units, led by *Kyokutō Maru* and *Tōhō Maru* (a published movement record of the tankers names seven), plus a naval oiler, *Shiriya*, for the bombardment of Midway. The tankers had been refitted that month to fuel ships under tow and on both sides at once. According to a published record of the tankers' movements, the fleet refueled 10 times on the way, and at 0630 on December 6, Hawaii time, about 400 miles north of Oahu, it took its last fuel and left the tankers behind. The plan had a fallback: if the winter sea made fueling impossible, Vice Admiral Nagumo Chūichi was to send in only the long-legged carriers *Kaga*, *Shōkaku* and *Zuikaku*.

Japan refueled at sea competently. What it did differently explains the outcome. Its big ships mostly fueled by the astern method, trailing a 6-inch hose from the tanker's stern, which Jonathan Parshall and Anthony Tully judge slower and more cumbersome than the American practice. The tankers were merchant ships, few in number, and the same hulls were needed to carry oil from the conquered East Indies to Japan. Before Midway a planner on the Naval General Staff warned that Japan's stock of tankers was small and already tied up between the fleet and the import trade. By May 1943 about 90 percent of Japan's merchant tanker tonnage was hauling oil home. The fleet got what was left.

The squeeze tightened through 1944. Japan's merchant tanker fleet reached its largest size, 837,000 gross tons, on January 1, 1944. The carrier raid on Truk in February (Chapter 13) wrecked so much of the Navy's tanker strength that the whole tanker fleet shrank by 13 percent in two months, and the submarine campaign did the rest (Chapter 12). Admiral Toyoda Soemu, who took command of the Combined Fleet in May 1944, told American interrogators in November 1945 what that meant for his plans:



The astern method, here used by the US oiler *Mattole* (AO-17) to fuel the destroyer escort *Pride* (DE-323), August 17, 1944. The Imperial Navy fueled its large ships this way, slower than alongside fueling.

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-245464 (VIA NHHC)

"I had asked for and obtained approximately 80,000 tons of tankers for fleet use, but we began to suffer damages through submarine operations; and by the time of the SAIPAN operation, the greatest hindrance to the drafting of the operation plans was the fact that we did not have sufficient tankers to support it."

He favored the A-Go plan partly because it would reduce the need for tankers, "which was, as already stated, our greatest handicap." At sea, the strain showed. Before the Battle of the Philippine Sea the battleship *Fusō* is recorded as having transferred most of her own fuel into oilers at Davao, and two supply forces with six oilers fueled the Mobile Fleet in the days before the battle, the last time on June 16 and 17, 1944. On June 20 American carrier aircraft caught the supply force: *Genyō Maru* and *Seiyō Maru* were scuttled and *Hayasui* was set afire.

So the fleet went to the oil. The battleships and cruisers of the Second Fleet spent the summer of 1944 at Lingga Roads near Singapore, close to the Sumatran and Bornean fields. Vice Admiral Kurita Takeo told interrogators that the shortage of fuel in the home islands required it; Captain Ohmae Toshikazu, chief of staff to Vice Admiral Ozawa Jisaburō, said the Second Fleet had been meant to stay in Japan and went south because there was not enough fuel. Asked whether, without the fuel shortage, both fleets would have been in the Inland Sea, Ozawa answered: "Yes." In October Kurita sailed for Leyte Gulf from Brunei Bay, and he told his interrogators that his tankers could not give his ships enough fuel for long voyages at high speed; they had to save fuel for the run back to Brunei. By April 1945, Toyoda said, the Navy had a very difficult time assembling the 2,500 tons of fuel oil needed to send *Yamato* and her escorting destroyers on their last sortie.

Japan had good anchorages and skilled seamen. What it did not build was a fleet train that moved with the fleet: oilers enough to serve both the navy and the nation, and repair ships, docks and storehouses afloat that could follow the carriers forward. Its fleet fought from fixed places where the fuel was. The American fleet carried its fuel with it.

OFF OKINAWA, THE FLEET STAYED

The difference showed first in the Philippines. From early September 1944 through January 23, 1945, the oilers of Acuff's Task Group 30.8, 34 of them in rotation, delivered more than 8 million barrels of fuel oil and 14.5 million gallons of aviation gasoline to the fast carriers at sea. Between October 6, 1944, and January 26, 1945, the fast carriers spent 13 of 16 weeks at sea. Halsey sent the group's rendezvous where he needed them, not where a plan had fixed them weeks earlier. In the three days before the Battle of Leyte Gulf, October 21–23, the oilers issued 338,000 barrels of fuel and 692,000 gallons of aviation gasoline to the four carrier task groups.

It was not free. Mitscher warned that his air groups were being worn down. In December 1944, in the Philippine Sea, Halsey's fleet tried to fuel in a rising sea; fueling was suspended at 1330 on the 17th and failed again the next day, though many destroyers were dangerously low on oil. In the typhoon that followed, three destroyers, *Hull* (DD-350), *Spence* (DD-512) and *Monaghan* (DD-354), capsized. Carter counted the fuel shortage among the reasons the lost ships could not get clear; *Spence* had run her tanks nearly dry, and the two older *Farragut*-class ships were dangerously top-heavy. A fleet that lived at sea lived with the sea.

In December 1944 Service Squadron 6 was established under Rear Admiral Donald B. Beary to take the whole fleet train to sea: oilers, ammunition ships, stores ships, escort carriers with replacement aircraft, tugs and escorts, under one command in the battle order, the Logistic Support Group. Off Iwo Jima in February 1945 its 27 oilers delivered 2,787,000 barrels of fuel oil, and Task Force 58 stayed at sea for 30 days and steamed more than 7,500 nautical miles.

Okinawa was the full test. Beary sailed from Ulithi on March 13, 1945, with one light cruiser as flagship, 16 oilers, 4 ammunition ships, 4 fleet tugs, 2 aircraft transports, 2 escort carriers, 12 destroyers and 7 destroyer escorts. On March 22, the first complete replenishment day, a British liaison officer on Mitscher's staff remarked that it was then he became fully aware of the versatility, power and efficiency of the United States Pacific Fleet. For the rest of the campaign the support group kept station in an ocean area about three days' steaming from Ulithi, between 22 and 24 degrees north. Empty oilers went back to Ulithi to reload from commercial tankers; full ones came out, five every four days at first, later two every three days.



The oiler *Cahaba* (AO-82) fuels the battleship *Iowa* (BB-61) and, on her port side, the aircraft carrier from which this photograph was taken, in the Pacific, 1945. The Navy's caption names the carrier as *Ticonderoga*, *Randolph* or *Shangri-La*; Carter and Wildenberg identify her as *Shangri-La* (CV-38), July 8, 1945.

U.S. NAVY PHOTOGRAPH, NATIONAL ARCHIVES 80-G-K-6112 (VIA NHHC)

The numbers are the story. During a three-week peak in April, 39 oilers were needed, issuing an average of 167,000 barrels of fuel oil and 385,000 gallons of aviation gasoline a day to the fast carriers alone. From March 17 to May 27 the Logistic Support Group issued 8,745,000 barrels of fuel oil, 259,000 barrels of diesel and 21,477,000 gallons of aviation gasoline at sea. Its five ammunition ships delivered 15,159 tons in 106 days of servicing. Four escort carriers ferried replacement planes, and one ammunition ship delivered aircraft engines; Carter concluded that every aviation item except wings could be delivered at sea. Only one oiler was damaged by enemy action in the whole campaign, by a suicide plane on April 16; the fires were put out and she was repaired in the forward area.

The fast carriers took heavy punishment off Okinawa and Kyushu (Chapter 10). They did not leave. From late April one task group at a time went back to Ulithi for 10 days, while the others held a covering position, Spruance wrote, for over three months. His verdict, as Carter quoted it:

The American fleet did it about 1,200 nautical miles from Ulithi, where its oilers reloaded, and more than 4,000 from Pearl Harbor. And in July 1945, off the coast of Japan itself, the Third Fleet held what the Navy's historians call probably the largest single replenishment at sea in history. On July 21 and 22, more than 100 ships took on 6,369 tons of ammunition, 379,157 barrels of fuel oil, 1,635 tons of stores and provisions, 99 replacement aircraft and 412 replacement men from Beary's oilers, am-

munition ships, stores ships and escort carriers, and went back to striking Japan.

◆

Worrall Carter liked to make big numbers concrete. Writing about Acuff's oilers in January 1945, when Halsey took the fleet into the South China Sea, he noted that they had issued 1,559,000 barrels of fuel oil in that one sortie, and invited the reader to picture it as a train of 8,000-gallon tank cars blocking the road to the Army–Navy game: 66.6 miles of them, taking 2 hours and 13 minutes to clear the crossing at 30 miles an hour. "The reader would miss the game."

> *"For the first time in history a fleet steamed to the threshold of an enemy homeland and, with its own air force embarked, stayed there at sea for a period of months until our own land and air forces were firmly established on the enemy's doorstep."*
>
> ADMIRAL RAYMOND A. SPRUANCE, QUOTED IN BEANS, BULLETS, AND BLACK OIL (1953)

OIL DELIVERED AT SEA

Fuel oil pumped into the fleet from oilers under way, campaign by campaign, 1943–45

EACH SHIP = 100,000 BARRELS OF FUEL OIL

GILBERTS
November 1943
1.33 M BBL

Total cargo of the 13-oiler fueling group; the whole fleet refueled at sea.

FAST CARRIERS, PHILIPPINES TO SOUTH CHINA SEA
September 1944 – January 1945
> 8 M BBL · 14.5 M gal avgas

34 oilers; carriers at sea 13 weeks out of 16. Lighter icons: Sept–Oct 1944 alone, 3.57 M bbl from TG 30.8's 29 oilers (Carter).

IWO JIMA
8 February – 5 March 1945
2.79 M BBL · 7.13 M gal avgas

27 oilers; TF 58 at sea 30 days, refueled three times.

OKINAWA
17 March – 27 May 1945
8.745 M BBL · 21.5 M gal avgas

Up to 39 oilers in the April peak.

OFF JAPAN, TWO DAYS
21–22 July 1945
0.38 M BBL

With 6,369 tons of ammunition and 99 aircraft.

Sources: Wildenberg, Gray Steel and Black Oil (1996): Gilberts pp. 181–82 (Table 19, total cargo of the 13-oiler fueling group); Sept 1944–Jan 1945 p. 189 and Iwo Jima p. 198 (both after Morison, vols. XII p. 76 and XIV p. 8). Carter, Beans, Bullets, and Black Oil (1953): Sept–Oct 1944 pp. 250–51; Okinawa p. 361. 21–22 July 1945: NHHC H-Gram 053-1. Fuel oil only; aviation gasoline shown in gallons where the source gives it. Each icon = 100,000 barrels, about one Cimarron-class oiler's cargo (103,233 bbl, Wildenberg Table 19).

■ Fuel delivered at sea. Fast carriers, September–October 1944: 3,567,000 barrels; September 1944–January 1945: more than 8,000,000; Iwo Jima, February 8–March 5, 1945: 2,787,000; Okinawa, March 17–May 27, 1945: 8,745,000; Third Fleet, July 21–22, 1945: 379,157 in two days.

CHART: NAVAL HIGH COMMAND, FROM WILDENBERG (1996), CARTER (1953) AND NHHC

He knew what kind of history he was writing: a story of tankers, barges, tugs and storeships, with no great battle at its center. In the preface to his book he explained his purpose: he wanted "those interested in naval history" to "realize that naval warfare is not all blazing combat."

On October 15, 1944, Tokyo announced that the American fleet had been beaten, while its carriers lay alongside their oilers taking on fuel and new airplanes. That fleet did not go home. It kept coming back to the fight, from oilers and lagoons thousands of miles from any American port, until Japan surrendered. The plain gray ships that kept it there are the reason.

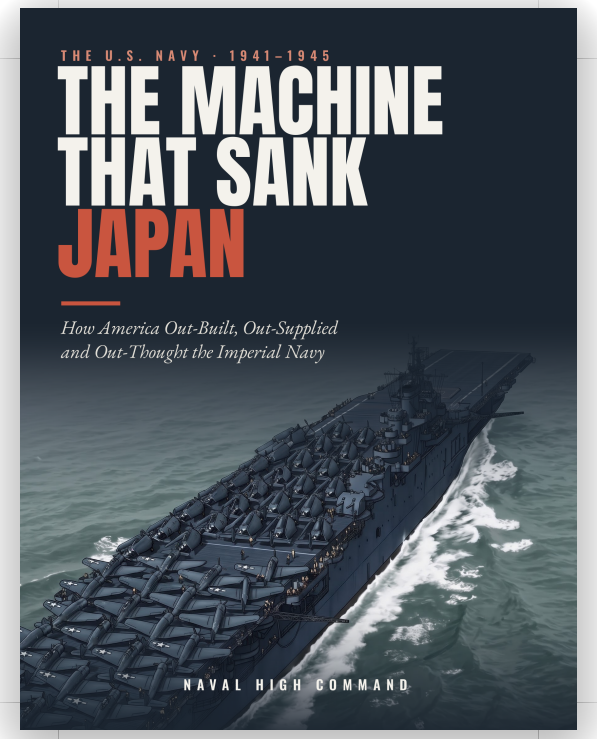
WATCH THE COMPANION VIDEO

JAPANESE ADMIRALS NEVER KNEW THE US FLEET COULD REARM WITHOUT RETURNING TO PORT

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The whole machine, part by part: the shipyards, the engines, the pilots, the Seabees, the codebreakers, the fleet train, the repair docks, the flight decks, damage control, radar and fire control, and the submarines.

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1 Carriers Faster Than Japan Could Sink Them

2 Shipyards Far From the Sea

3 Planes and Engines

4 Training Pilots Faster Than Japan Lost Them

5 The Seabees

6 The Codebreakers

7 The Fleet That Never Went Home *(this sample)*

8 Repairs in Mid-Ocean

9 Flight Decks

10 Damage Control

11 Seeing and Hitting

12 Submarines: From Broken Torpedoes to Wolf Packs

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