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# 31

## — AMPHIBIOUS BATTLE —

# OKINAWA

**W**ith the fall of the Philippines and the capture of the Marianas, the war in the Pacific approached its climactic amphibious phase. Ground fighting was to continue throughout 1945 at a score of places inside or close to the Japanese 'defensive perimeter' of 1942; in Burma and the northern Philippines, where Manila would become a ghost city as devastated as Warsaw, fighting was to be very heavy indeed. The character of the Pacific war, however, now underwent a radical change. No longer would there be two separate and competitive American strategies, with the navy bringing overwhelming force to the landing of individual Marine divisions on tiny, remote atolls, while the army moved by shorter hooks in greater strength to seize large land masses in the Indies. Navy and army would now combine to mount large-scale amphibious operations against the outlying islands of Japan itself, involving several divisions at a time, enormous fleets and naval air forces as well as dense concentrations of embarked troops. The success of these operations would depend entirely on the combined amphibious skills of sailors, soldiers, airmen and Marines.

The Joint Chiefs of Staff had confidence in the outcome of the projected operations, of which the most important was to be the landing on Okinawa in the Ryuku islands, only 380 miles from Kyushu, the southernmost of the large Japanese home islands. American amphibious skills were now very high but had taken time to develop – indeed, they had been developing throughout the Pacific campaign. Credit for their conception, however, belonged above all to the United States Marine Corps, which had seen the need to learn how troops could best be transferred from ship to shore twenty years before the Second World War began. The United States Marine Corps put forward the idea that transit between ship and shore must be essentially a tactical movement. The idea, so arrestingly simple, had been grasped by none of the oceanic powers before. Neither the British nor the French, though they had built great empires by projecting military through naval force,

had perceived that there was more to landing troops than putting them in ships' boats and debarking them at the water's edge. When in 1915 they jointly mounted the great amphibious landing at Gallipoli the result was catastrophic. Hastily adapted lighters, towed to shore by steam pinnaces, were grounded under Turkish machine-guns and the soldiers on board were massacred in the water. After the First World War the US Marine Corps determined that such would not be its men's fate. It had, admittedly, an institutional reason for wishing to make amphibious landing tactics its own particular specialism, for it entertained the fear – common to small organisations which operate between the margin of two larger ones – of being absorbed by either the army or the navy; but there was more to it than that. The Marines foresaw the danger of a Pacific war with Japan. They also saw that it could be won only with specialised methods and specialised equipment, and they set about developing both.

The architect of the Marines' amphibious warfare doctrine was Major Earl Ellis, who in 1921 first proposed the concept of landing as a 'ship-to-shore tactical movement'. He emphasised the need for landing troops to be covered with the heaviest available firepower as they left the ship, to debark on the run and to take up their first positions not on the beach itself but on dry ground inland. Sea and beach, in short, were to be regarded as a no man's land. The fighting would commence in or beyond the enemy's first defensive line well above the high-water mark. The realisation of such a concept required not only special training but also purpose-built equipment. One item was a dive-bomber, operating from a carrier but flown if possible by pilots of the Marines' own air arm; dive-bombing was an essential means of delivering pinpoint firepower on to enemy beach strongpoints. The other was a 'dedicated' landing craft, with the power to cross the danger zone between ship and shore at high speed, and with the build to enable it to beach, debark and back off without waiting for tides. With time, the US Marine Corps perceived the need for two and eventually three types of landing craft. The first was a tracked amphibian or amphtrac, armoured if possible, which could actually drive out of the water and across the beach before its occupants debarked; a prototype was produced in 1924 by Walter Christie, the astonishingly creative American tank pioneer (who also fathered the T-34). The second was a larger beaching craft to carry the second wave; the successful model, the Higgins boat, was based on a civilian design built by the Higgins Company of New Orleans for use in the Mississippi delta. The third was a ship capable of beaching tanks; the sketch for the first of more than a thousand Landing Ship Tanks (LST) built during the war was roughed out in a few days in November 1941 by John Niedermair of the US Navy's Bureau of Ships. All three types could, of course, also be used to tranship the supplies which the landing troops needed once ashore.

By early 1945 the Pacific Fleet possessed all three types and many variations, in enormous numbers; the United States Coast Guard had specialised in the role of manning the Marines' landing craft. In addition it possessed large numbers of fast 'attack transports', on which landing troops and craft were embarked, and which could keep pace with the

destroyers and carriers of an amphibious task force. It also had numbers of dedicated command ships from which admirals and generals could jointly direct operations.

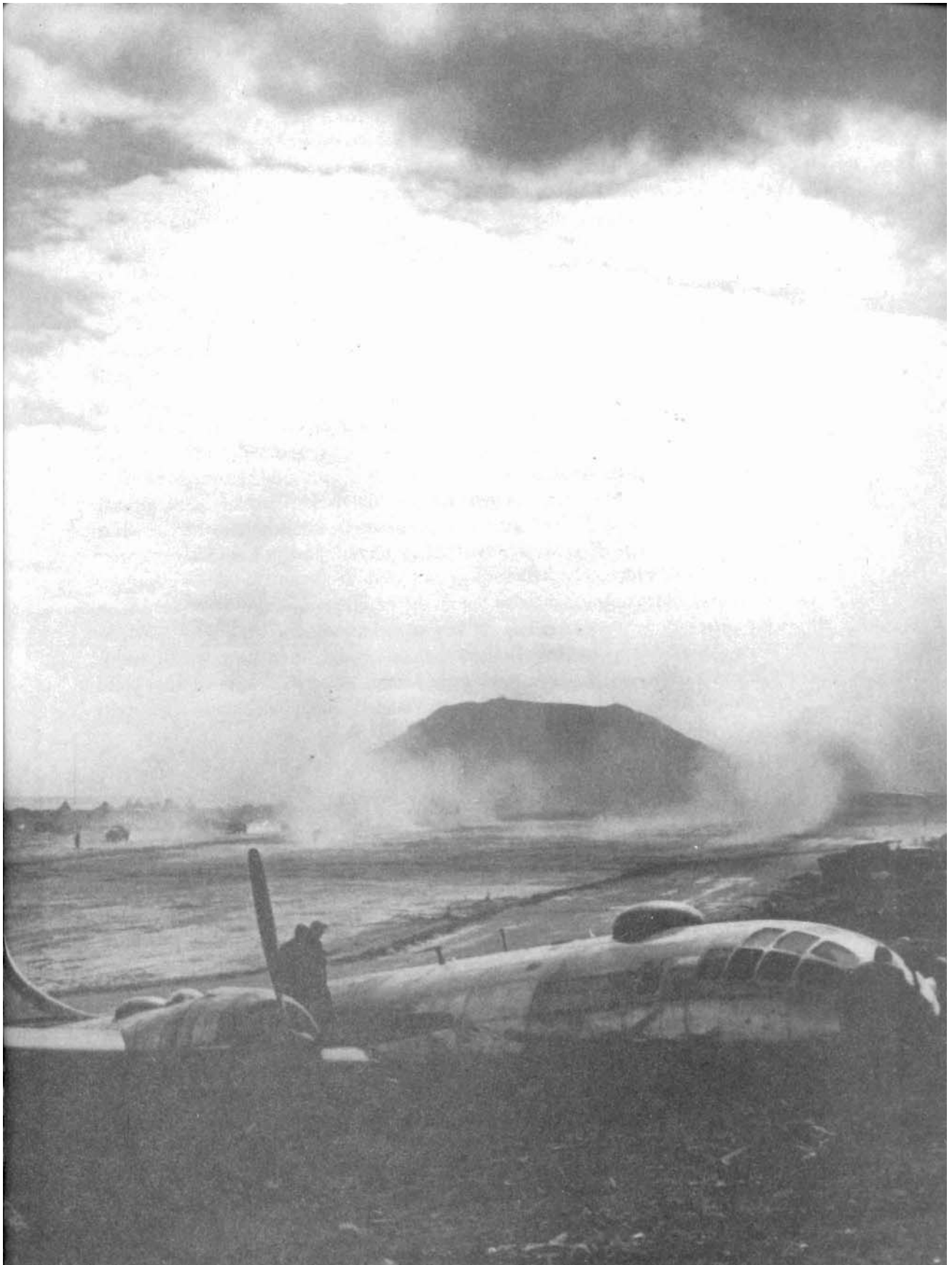
Plans for the advance to the Ryuku islands had been laid as early as July 1944, before the Leyte landing, when Admiral Raymond Spruance, commanding the Fifth Fleet, had suggested that intermediate positions, particularly Formosa, should be bypassed and a giant stride taken to Japan's doorstep. Admiral King, Chief of Naval Operations, at first thought the scheme over-ambitious. By September, however, when it became clear that the persistence of the war in Europe (through Hitler's evident determination to stand on the West Wall) and MacArthur's deep involvement in the Philippines precluded the release of more army formations, King relented. With six Marine divisions and five army divisions under his command, Nimitz now had an independent force of sufficient size for him to mount large-scale operations of his own. On 29 September 1944, therefore, King, Nimitz and Spruance, meeting at San Francisco, agreed to make Okinawa the principal target for amphibious operations in the following year. Because a main aim of the advance to the Ryukus was to secure better air bases for the preparatory bombardment of Japan and to drive an 'air corridor' between the home islands and the Japanese airfields on Formosa and Luzon, it was also agreed that a subsidiary base should be seized on a smaller island nearby, which could be taken more quickly, to provide a staging post and emergency landing field for B-29s. Iwo Jima in the Bonin islands seemed the best choice. On 3 October the Joint Chiefs of Staff issued a directive for Iwo Jima to be attacked in February and Okinawa in April.

### — The Ten-Go plan —

Meanwhile the Japanese were revising their own plans for the future conduct of the war. In September 1943 they had accepted that the 1942 defensive perimeter was untenable and had defined a new Absolute National Defence Zone, enclosing the Kuriles to the north of the home islands, the Bonins, Marianas and Carolines in the central Pacific, and western New Guinea, the East Indies and Burma in the south-west. Subsequently the American advance in 1944 had so deeply penetrated this zone that plans based on its defence were abandoned, and its architects withdrew from government; in July Tojo resigned as Prime Minister, to be replaced by the more moderate Kuniaki Koiso, though the inclusion of representatives of the war and navy ministries in the cabinet ensured that it remained under military control. By the spring of 1945 the situation had so gravely deteriorated everywhere except in China (where the Ichi-Go offensive proceeded) that imperial headquarters had to think again. It formulated a plan codenamed Ten-Go for the defence of the most vulnerable points on what remained of Japan's defensive cordon, which

**Overleaf:** One of the airstrips at Iwo Jima. The B-29 in the foreground is one of over 2500 damaged bombers which landed on Iwo Jima before the end of the war.





included the island of Hainan between China and Indo-China, the China coast itself, Formosa and, lastly, the Ryukus. The sub-plan for the defence of the Ryukus, of which Okinawa was recognised to be the island most at risk, was codenamed Ten-Ichigo, and 4800 aircraft based on Formosa and the home islands were allotted to its execution. Because of the shortage of fuel, which limited the number of sorties that could be flown and severely restricted the pilots' training hours, Ten-Ichigo was to be a new sort of offensive. The aircraft would be loaded with high explosive and would fly one-way missions to crash themselves on American ships in what the Americans would learn to call 'kamikaze' ('divine wind') suicide strikes.

The Americans had already experienced a foretaste of kamikaze tactics on the last day of the Battle of Leyte Gulf, but fortunately those suicide missions had been hastily improvised. Ten-Ichigo was more methodically prepared and was not ready for launching when the 3rd, 4th and 5th Marine Divisions assaulted Iwo Jima on 19 February. That was the only mercy granted the Americans at Iwo Jima; heavily gunned and garrisoned, honeycombed with tunnels, its bedrock of basalt covered with a deep layer of volcanic dust, the island subjected the Marines to their worst landing experience of the Pacific war. Amphtracs lost traction and ditched on the beaches, to be destroyed by salvos from close-range artillery which three days of battleship bombardment had not destroyed; riflemen dug trenches which collapsed as soon they were deep enough to give cover; the wounded were wounded again as they lay out on the beaches awaiting evacuation. Robert Sherrod, the correspondent who had been at Tarawa and most island landings in between, thought it the worst battle he had ever seen: men died, he said, 'with the greatest possible violence'. When Iwo Jima was finally secured on 16 March, 6821 Americans had been killed and 20,000 wounded, over a third of those who had landed; the 21,000 Japanese defenders died almost to a man.

### — Okinawa, the last battle —

Iwo Jima provided an awful warning of what lay in store for the American divisions assigned to Okinawa – the 1st, 6th and 7th Marine, and the army's 7th, 27th, 77th, 81st and 96th Divisions. Because of the casualties taken at Iwo Jima on the first day, it was decided to make the preparatory bombardment the heaviest yet delivered on to a Pacific island. It lasted from 24 to 31 March, and when it was over nearly 30,000 heavy-calibre shells had impacted on the landing area. On 1 April, from an armada of 1300 ships including eighteen battleships, forty carriers and 200 destroyers, the 1st and 6th Marine and 7th and 96th Divisions raced to shore in their amphtracs and Higgins boats to seize the central waist of the island, where its airfields lay, and then reduce resistance in the two halves.

Okinawa is a large island nearly eighty miles long. The American scheme for its capture was based on the supposition that, as at all but one landing so far, the Japanese would resist tenaciously at the water's edge and then be beaten back inland, to increasingly



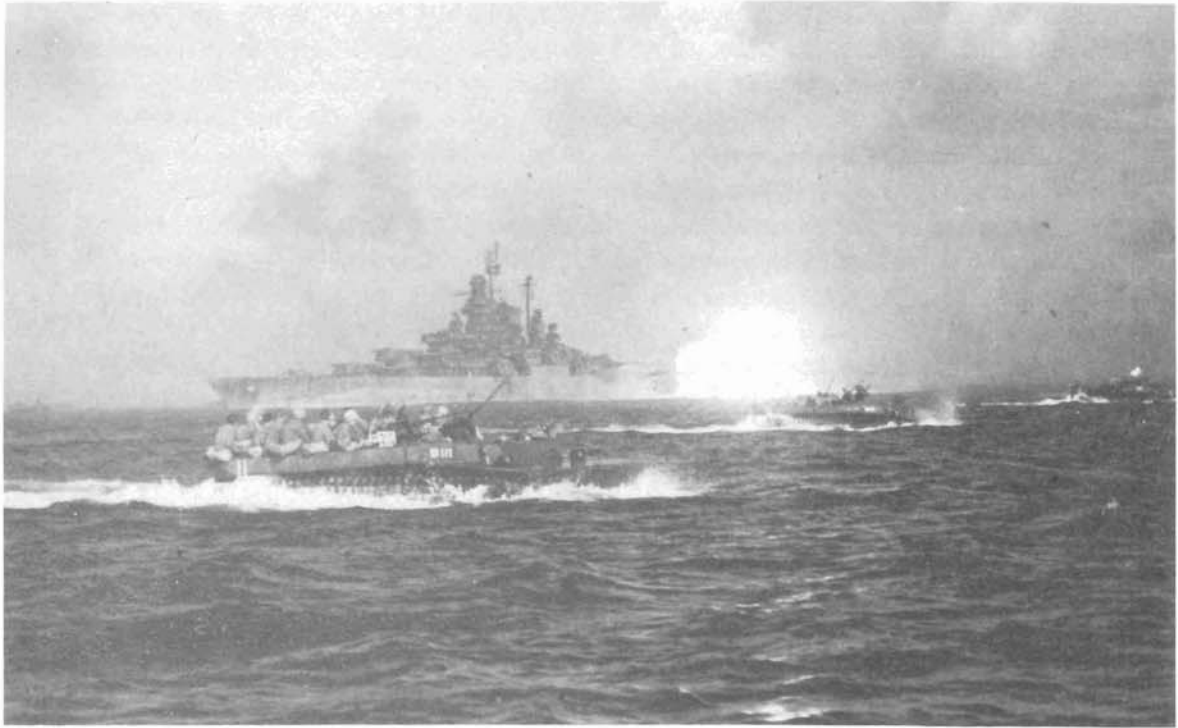
untenable positions, by the weight of American air and naval firepower. The Japanese, anticipating American expectations, had adopted a contrary scheme for Okinawa's defence. They were to let the Marine and army divisions land unopposed, then draw them into battle against what they regarded as impregnable defence lines within the island, meanwhile turning the weight of the kamikaze against the ships offshore. The ultimate aim was to drive the fleet away, leaving its landbound half to be destroyed at leisure.

The Japanese forces on the island numbered some 120,000 against 50,000 Americans landed on the first day – a figure that eventually rose to nearly a quarter of a million in the US Tenth Army. These Japanese troops were organised into the 24th and 62nd Divisions and together with a large number of non-divisional units formed the Thirty-Second Army, commanded by General Mitsuru Ushijima. He was more realistic than the staff officers in imperial general headquarters, since he recognised that victory on Okinawa was unattainable; nevertheless he intended to inflict the largest possible toll of casualties on the invaders, and had made preparations accordingly. The island was honeycombed with tunnels and firing positions, many of which concealed large-calibre weapons; and the fighting positions formed a series of lines which extended from the beaches where he had correctly judged the Americans would land into the high ground to the south and north.

The Americans landed virtually without loss on 1 April. The 1st and 6th Marine Divisions (whose volunteer soldiers were for the first time in the war diluted with conscripts) then turned north to clear the top of the island before joining the army's 7th and 96th Divisions in the battle for the more mountainous south. By 6 April, as casualties mounted, both were in contact with the Machinato Line covering the southern cities of Shuri and Naha. It was on that day that the Japanese air and sea offensive against the offshore fleet began.

The Americans had already had a taste of how fiercely the Japanese intended to defend Okinawa when Task Force 58, still commanded by the resolute Admiral Mitscher, had raided the Inland Sea on 18–19 March as a preliminary to the landing. Although American carrier aircraft had destroyed some 200 Japanese aircraft, the task force had also suffered heavily itself. The carrier *Wasp* was badly damaged by a kamikaze and only saved by rapid firefighting, a technique at which the American now excelled all other navies. Another carrier, *Franklin*, was hit by two bombs which almost incinerated the ship; 724 of her crew died, the highest fatal casualty toll suffered by any surviving American ship in the Pacific war.

On 6 April kamikazes attacked in dense waves; at the same time, far to the north, Japan's last operational surface force, the giant battleship *Yamato* escorted by a cruiser and eight destroyers set sail from Japan. *Yamato* had taken on board the last 2500 tons of fuel available at her Japanese home port to make the one-way trip. Her mission was to penetrate the screen around the Okinawa beaches and inflict unacceptable damage on the amphibious force. She was detected long before she got within range, however, and at noon on 7 April was taken under attack by 280 aircraft of Task Force 58. Between noon



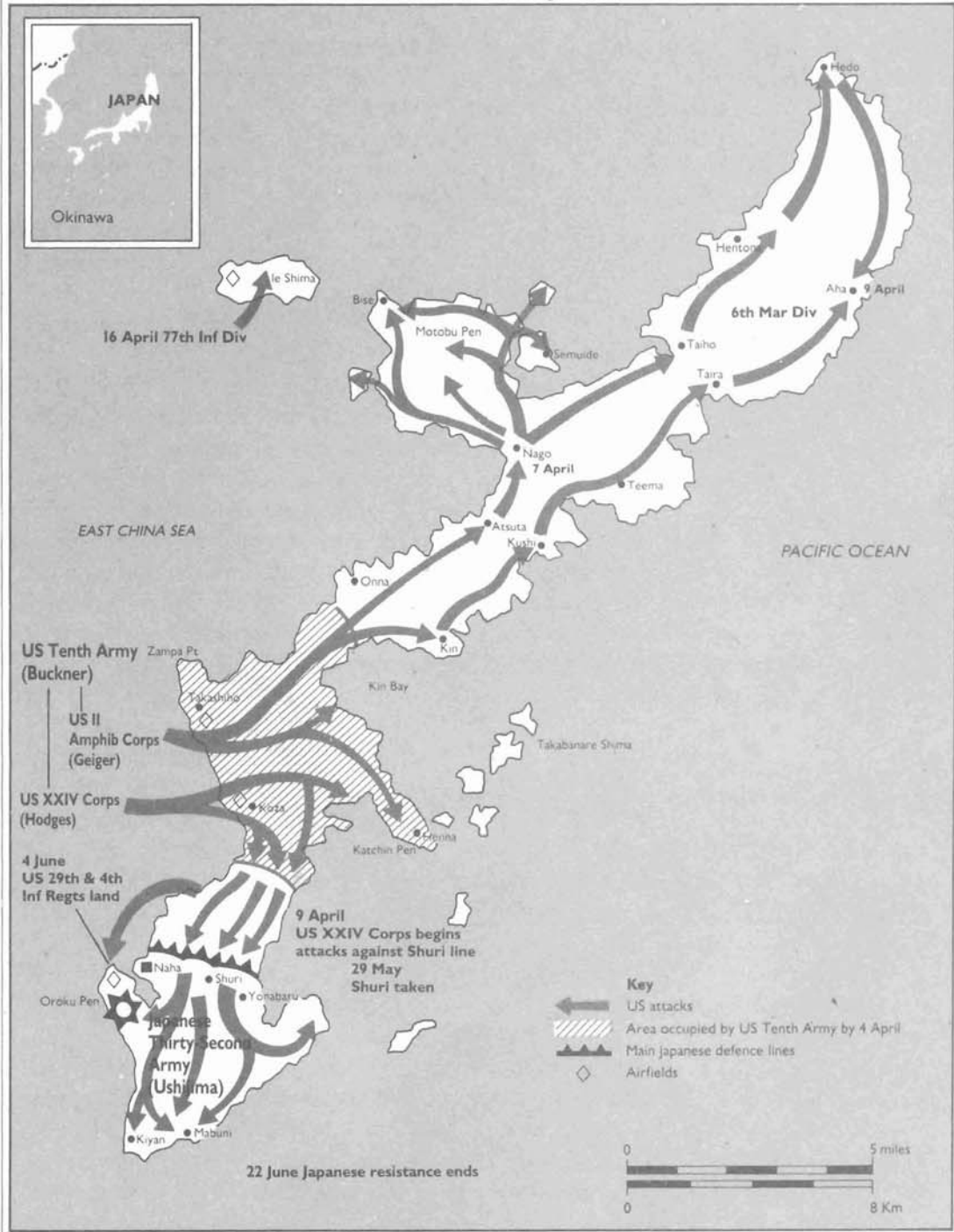
Amphibious landing craft churn towards Okinawa, 1 April 1945, while the 16-in guns of a battleship plaster the shoreline. In taking the island the Americans suffered nearly 50,000 casualties, over 12,000 of them dead. In contrast the Japanese sustained 117,000 casualties, of whom 110,000 were killed.

and two o'clock she suffered six torpedo hits, lost speed and steering, became a sitting duck to successive waves of American aircraft and at 2.23 pm rolled over and sank with almost all the 2300 sailors on board. Her cruiser and four of her seven destroyer escorts were also sunk. This 'Special Surface Attack Force' had launched the Imperial Japanese Navy's last sortie of the war.

The kamikazes proved far more difficult to repel. About 900 aircraft, of which a third were on suicide missions, attacked the amphibious fleet on 6 April and by the end of the day, although 108 were shot down, three destroyers, two ammunition ships and an LST had been sunk. The attacks were repeated on 7 April when a battleship, a carrier and two destroyers were all hit by kamikaze strikes. The American response was to thicken the screen of radar-picket destroyers, lying off Okinawa up to ranges of 95 miles, which gave early warning of attacks. There were soon sixteen on station, eleven of which lay in the semicircle between the north-eastern and south-western azimuths, nearest Japan and Formosa. As the British task force at the Falklands was to rediscover forty years later,



# OKINAWA, APRIL-JUNE 1945







**Left:** The flight deck of the carrier USS Bunker Hill after direct hits by two kamikaze aircraft within the space of one minute on 11 May 1945 during the fighting for Okinawa. In the two months that the US fleet stood off Okinawa the Japanese flew 1900 kamikaze missions, sinking 38 warships, mostly smaller types, and damaging dozens more. They also sacrificed the battleship Yamato, which was despatched on a suicide mission, with fuel for a one-way journey, only to be sent to the bottom off Okinawa by 300 US aircraft on 7 April. **Above:** Transferring the wounded from the USS Bunker Hill.



US Marines cautiously await the results of a satchel charge tossed into a Japanese stronghold in the murderous terrain of Okinawa, which saw some of the most savage fighting of the Pacific war.

however, a screen of radar pickets may give the large units of a fleet early warning of attack; but its mission is a sacrificial one, for the incoming enemy strikes readily choose its ships as targets. That was to be the American destroyers' fate. Between 6 April and 29 July fourteen American destroyers were sunk by suicide pilots, together with another seventeen LSTs, ammunition ships and assorted large landing craft lying within the screen. Over 5000 American sailors died as a result of the Okinawa kamikaze campaign – the heaviest toll the US Navy had suffered in any episode of the war, including Pearl Harbor.

Between 6 April and 10 June, besides many smaller missions the kamikaze corps mounted ten mass attacks by 50–300 aircraft, which damaged battleships and aircraft carriers as well as destroyers; the venerable *Enterprise* and the newer carriers *Hancock* and

Bunker Hill were all kamikaze victims, and Bunker Hill, Spruance's flagship, lost 396 of her crew killed. American carriers, which were horizontally armoured above the engine room but below the flight deck, burned all too easily when a kamikaze landed aboard. A principal advantage of the four British carriers of Task Force 57, which joined the American force off Okinawa in March, was that they were armoured on their flight decks as a precaution against the shellfire likely to be encountered in narrower European waters, and therefore survived kamikaze strikes without serious damage.

Ultimately the kamikaze attacks could not go on, for the Japanese began to run out of both pilots and aircraft; the number of raids was heavier in April than in May and far heavier in May than in June, when only four ships were sunk. However, the pickets were bound to remain in place – and so expose themselves to damage or sinking, at almost unbearable cost to their crews' nerves – as long as the army and Marines battled ashore. As the campaign protracted, Nimitz grew increasingly impatient with the Tenth Army commander, General Simon Bolivar Buckner, complaining that he lost 'a ship and a half a day' at the pace at which the front was moving. Buckner, son of the general who had fought Ulysses S. Grant in the American Civil War in 1862, resolutely defended his methodical tactics. Successive ridge lines imposed delay on every offensive mounted. The lines were washed by constant rain, which bogged tanks trying to give support, and they were fanatically defended by Japanese who, whether trained infantrymen or wholly inexperienced naval shore personnel, fought literally to the death. Not until the end of June did resistance cease, and some 4000 Japanese surrendered in the last days. All the Japanese senior officers, including Ushijima, committed ritual suicide, as did many of their subordinates and some civilian Japanese. The Okinawan population, 450,000 strong at the outset, had suffered terribly; at least 70,000 and perhaps as many as 160,000 died in the course of the fighting. Thousands took refuge in the island's numerous caves, which the garrison subsequently occupied as strongpoints, and were killed when the American infantry attacked them with flamethrowers and high explosive.

For the fighting troops Okinawa had been the grimmest of all Pacific battles. The American army divisions lost 4000 killed, the Marine Corps 2938; 763 aircraft were destroyed and 38 ships sunk. The Japanese lost 16 ships and an almost incredible total of 7800 aircraft, over a thousand in kamikaze missions. The Japanese servicemen on the island – shore-based sailors as well as front-line riflemen, clerks, cooks, Okinawan labour conscripts – found ways of dying almost to the last man. The American total of prisoners, including men too badly wounded to commit suicide, was 7400; all the others, 110,000 in number, died refusing to surrender.

# 32

## SUPER-WEAPONS AND THE DEFEAT OF JAPAN

Okinawa left an awful warning of what awaited the American forces as the Pacific war drew in towards the perimeter of the Japanese home islands. It was the first battle for a large island on the approaches to the empire's heartland, and its cost and duration hinted at far worse ordeals to come once the United States Navy advanced to land soldiers and Marines on the shores of the Inland Sea. From a source never satisfactorily identified, the figure of 'a million casualties', even 'a million dead', had begun to circulate among American strategic planners as the number of losses to be expected in an invasion of Japan. It cast a terrible shadow over their discussions of how the victorious campaign in the Pacific was to be brought to an end without a national tragedy.

So far – and this implies no slur on the courage, dedication and self-sacrifice of the American sailors, Marines and soldiers who fought and died in the front line – the Pacific war had been a small war. The number of major ships engaged exceeded that deployed in any other theatre: with a dozen battleships, fifty aircraft carriers, fifty cruisers, 300 destroyers and 200 submarines, the Pacific Fleet in 1945 was not only the largest navy in the world but the largest navy that had ever existed; it had extinguished the Imperial Japanese Navy, whose few units still afloat lacked the fuel for them to put to sea. The American naval air force, 3000 strong, was also the largest in being; in addition the navy and the US



Army Air Force had tens of thousands of shore-based aircraft, including the B-29 Superfortress, 250 of which had begun to operate regularly against Japanese cities since March, with devastating effect.

The Pacific war had been an enormous war in its geographical scope, encompassing over 6 million square miles of land and ocean. In terms of human numbers, however, the war had been quite small compared to that fought in Europe. There the Soviet Union had mobilised 12 million men against Germany's 10 million, and the theatre had also engaged most of Britain's 5 million and about a quarter of the United States' 12 million. In the Pacific, by contrast, although the Japanese had mobilised 6 million men, five-sixths of those deployed outside the home islands had been stationed in China; the number committed to the fighting in the islands had perhaps not exceeded that which America had sent. Between 1941 and 1945 a million and a quarter United States servicemen were posted to the Pacific and China-Burma-India theatres; of these, however, only 450,000 belonged to army or Marine divisions, and of those twenty-nine divisions only some six army and four Marine divisions were involved in regular periods of prolonged combat. Compared to the European theatre, where in mid-1944 300 German and satellite divisions confronted 300 Russian and seventy British and American divisions, the 'ground combat' dimension of the Pacific war was small indeed – if one sets aside the appalling casualties suffered by the Japanese island garrisons.

In the aftermath of Okinawa, its scale suddenly threatened to swell exponentially. The surrender of Germany meant that all of the ninety divisions the United States had mobilised and most of the British Empire's sixty could be made available for the invasion of Japan, together with whatever proportion of the Red Army Stalin decided to allot as soon as he declared war (as he had undertaken to do, once Germany was defeated, at Tehran in November 1943). According to the Okinawan experience, however, even numbers such as these could not guarantee that the defeat of the Japanese on their home territory would be quick or cheap. Okinawa and Japan were similar in terrain, but Japan offered a defender a vast succession of ridge, mountain and forest positions from which to hold an invader at bay. The prospect appalled the United States' decision-makers. Admiral William Leahy, chairman of the Joint Chiefs of Staff, pointed out to President Truman at a meeting on 18 June that the army and Marine divisions had suffered 35 per cent casualties on Okinawa, that a similar percentage could be expected in an attack on Kyushu, the first of the Japanese home islands selected for invasion, and that, with 767,000 men committed to the operation, the toll of dead and wounded would therefore amount to 268,000, or about as many battle deaths as the United States had suffered throughout the world on all fronts so far.

Truman's comment was that he 'hoped there was a possibility of preventing an Okinawa from one end of Japan to the other'. The Joint Chiefs' plan, worked out in Washington at the end of May 1945, called for an invasion of Kyushu (codenamed Olympic) in the autumn of 1945 and an assault on the main island of Honshu (codenamed

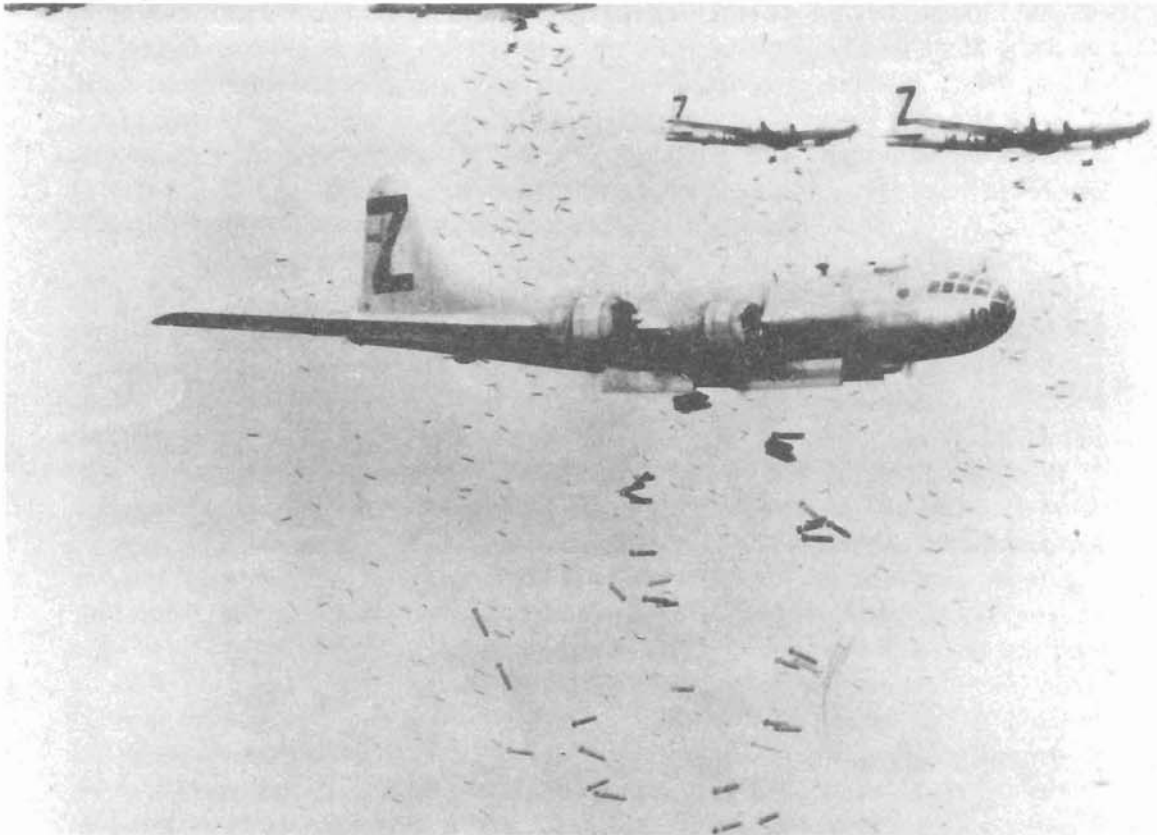
Coronet) in March 1946. It had been agreed with difficulty. The army, whose view had been largely fixed by MacArthur, insisted that only an invasion would definitively finish the war. The navy, to which the US Army Air Force commanders lent unspoken support, argued that the seizure of bases on the coast of China from which close-range strategic air bombardment could be mounted would reduce Japanese resistance without the need to risk American lives in an amphibious landing. Strategic bombing, however, had thus far inflicted little damage on the home islands and had had insignificant effect upon its government's will to war. MacArthur's view therefore prevailed.

### — The destruction of Japan's cities —

Before the Joint Chiefs of Staff issued their directive for Olympic and Coronet, however, the strategic bombing campaign had taken a different turn. Like the British bomber chiefs in 1942, the Americans had been constrained to abandon the belief – which they had held much more dogmatically than the British – that the bomber was a precision tool and to accept that it had to be used as a blunt instrument. They had been driven to that change of doctrine by the success of the Japanese (in imitation of Speer's programme in Germany in 1943–4) in dispersing production of weapon components away from the main industrial centres to new factories which could not be easily located or hit by the Twentieth Air Force. In February 1945 General Curtis LeMay arrived in the Marianas, which had become the main base for the Superfortresses of XXI Bomber Command, to implement new bombing tactics. Targets were to be subjected not to precision high-level daylight strikes by high explosive but to low-level drenching by incendiary bombs at night, exactly the method by which 'Bomber' Harris had made his 'thousand-bomber raids' an instrument of terror in 1942 and created firestorms in one German city after another. The incendiary bomb LeMay's aircrew used, however, being filled with jellified petrol, was a far more efficient agent of conflagration than the RAF's; more important, Japan's flimsy wood-and-paper cities burned far more easily than European stone and brick.

On 9 March Bomber Command attacked Tokyo with 325 aircraft armed exclusively with incendiaries, flying at low altitude under cover of darkness. In a few minutes of bombing the city centre took fire and by morning 16 square miles had been consumed; 267,000 buildings burned to the ground, and the temperature in the heart of the firestorm caused the water to boil in the city's canals. The casualty list recorded 89,000 dead, half as large again as the number of injured survivors treated in the city's hospitals. Losses to the bombers were below 2 per cent and were to decline as the campaign gathered force. LeMay's command soon rose in strength to 600 aircraft and brought one city after another under attack; by mid-June Japan's five other largest industrial centres had been devastated – Nagoya, Kobe, Osaka, Yokohama and Kawasaki – 260,000 people had been killed, 2 million buildings destroyed and between 9 and 13 million people made homeless.

The destruction continued relentlessly, at virtually no loss to the American bomber



*B-29s over Yokohama, 29 May 1945, a daylight raid on which their P-51 escorts shot down 26 Japanese fighters.*

crews but at appalling cost to Japan; by July 60 per cent of the ground area of the country's sixty larger cities and towns had been burnt out. As MacArthur and other military hardheads had argued, however, the devastation did not seem to deflect the Japanese government from its commitment to continuing the war. In early April, after failing to draw China into a separate peace, Koiso had been replaced as Prime Minister by a moderate figurehead, the seventy-eight-year-old Admiral Kantaro Suzuki; Tojo, though a deposed Prime Minister, nevertheless retained a veto over cabinet decisions through his standing in the army, and he and other militarists were determined to fight it out to the end. This determination exacted sacrifices which even Hitler had not demanded of the Germans in the closing months of the war. The food ration was reduced below the 1500 calories necessary to support life, and more than a million people were set to grubbing up pine roots from which a form of aviation fuel could be distilled. On the economic front, reported a cabinet committee instructed by Suzuki to examine the situation, the steel and

chemical industries were on the point of collapse, only a million tons of shipping remained afloat, insufficient to sustain movement between the home islands, and the railway system would shortly cease to function. Still no one dared speak of peace. Tentative openings made in May through the Japanese legation in Switzerland by the American representative, Alan Dulles, were met with silence; over 400 people were arrested in Japan during 1945 on the mere suspicion of favouring negotiation.

### — The search for revolutionary weapons —

In midsummer the American government began both to lose patience at Japan's intransigence and to yield to the temptation to end the war in a unique, spectacular and incontestably decisive way. They were aware through Magic intercepts that the Suzuki cabinet, like Koiso's before it, was pursuing backdoor negotiations with the Russians, whom it hoped would act as mediators; they were also aware that a principal sticking-point in Japan's attitude to ending the war was the 'unconditional surrender' pronouncement of 1943, which all loyal Japanese recognised as a threat to the imperial system. However, since the Russians mediated in no way at all, and since the Potsdam conference following the surrender of Germany indicated that unconditional surrender need not extend to the emperor's deposition, America's willingness to wait attenuated during the summer. On 26 July the Potsdam Proclamation was broadcast to Japan, threatening 'the utter destruction of the Japanese homeland' unless the imperial government offered its unconditional surrender. Since 16 July President Truman had known that 'utter destruction' lay within the United States' power, for on that day the first atomic weapon had been successfully detonated at Alamogordo in the New Mexico desert. On 21 July, while the Potsdam meeting was in progress, he and Churchill agreed in principle that it should be used. On 25 July he informed Stalin that America had 'a new weapon of unusually destructive force'. Next day the order was issued to General Carl Spaatz, the commander of the Strategic Air Forces, to 'deliver its first special bomb as soon as weather will permit visual bombing after about 3 August 1945 on one of the targets: Hiroshima, Kokura, Niigata and Nagasaki'. The attempt to bring the Second World War to an end by the use of a revolutionary super-weapon had been decided.

The search for a revolutionary weapon was one of the most immediate and persistent outcomes of the industrialisation of war in the mid-nineteenth century, and both a logical and an inevitable extension of the revolution in war which preceded it. Until the fifteenth century, warfare was a muscular activity, and decision on the battlefield went to the side which could sustain muscular effort longer than the other. The invention of gunpowder changed that; by allowing energy to be stored in chemical form, it made the weak man the equal of the strong and transferred advantage in war to the side which possessed superior intellectual quality and morale. The first attempts to draw on the products of industrialisation for military purpose therefore took the form of multiplying

the power of chemical energy by accelerating the rate at which projectiles could be discharged; breech-loading and magazine rifles and then the machine-gun were the result. Their purpose was to nullify morale and intellectual quality by weight of metal.

When human resilience and adaptability demonstrated that the fighting man of the industrial age could survive even quantum leaps in firepower, military inventors changed their tack. They began to apply their inventiveness not to the problem of killing or disabling warriors *en masse* but to attacking and destroying the protective systems in which they took shelter – on land, fortifications; at sea, armoured ships. Human ingenuity had sought a means of destroying ships by stealth even before the industrial age, and the idea of the submarine and the torpedo had found primitive forms in sailing days. Between 1877 and 1897 both the torpedo and the submarine emerged as practicable weapons and did indeed transform the nature of naval warfare. The tank, which appeared in 1916, promised a comparable transformation of land warfare.

The promise, however, proved illusory. Tank and submarine, though they appeared to be strategic weapons in essence, were more or less quickly revealed to be tactical; that is to say, they were susceptible to counter-measures at the point of encounter and they struck at the products, not the structure, of an enemy's war-making system. However great the human losses and material damage they inflicted at the battlefield, the enemy, as long as he could replace those losses and repair that damage from his internal resources, might continue to wage war. The production of tanks and submarines, as those committed to battle were destroyed and had to be replaced from current output, itself became a charge on industrial capacity and therefore merely raised instead of reducing the price of victory.

This perception was one of the most important military legacies of the First World War. It was to lead to the formulation of the theory of strategic bombing. In the years after the war, both the British and the American air forces were converted to the belief that the heavy bomber, by carrying the high explosive which had proved so ineffectual against trench systems to the industrial heartland of the enemy, could quickly and finally destroy his means of making war and so win victory without the need for armies or navies to fight 'decisive' battles at all. The British further persuaded themselves that if such a 'strategic bombing' campaign were carried out at night it would spare the bombing force appreciable loss, while the Americans independently arrived at the conclusion advanced by the Italian dogmatist, Giulio Douhet, that a large, heavily armed day-bomber could be made self-defending: the Flying Fortress was the result.

As we have seen, the experience of war proved the theory of strategic bombing to be ill founded. A major cause of its failure lay in the realisation of one of the war's greatest scientific endeavours, the development of radar. Invented by the British before the outbreak, in 1940 it provided an effective though static chain of early-warning stations which allowed Fighter Command to be directed quickly and accurately against incoming Luftwaffe raids during the Battle of Britain. The British invention of the cavitron valve, which became operational in 1942, enabled radar to function at 'centimetric' wavelengths



on a directional arc. These developments, which greatly reduced the bulk of radar sets, increased the definition of the image received and allowed the operator to search a chosen sector of air space, meant that effective search radars could be mounted in night-fighters; a further application of the cavitron valve was the miniaturised radar proximity fuse, introduced in August 1944, which exploded an anti-aircraft shell at a range lethal to an aircraft. It was used with considerable success against the V-1s. When 'centimetric' radar was developed by the Germans, however, they began to inflict a heavy toll on Bomber Command during its night raids on the Reich; had they also discovered the secret of miniaturising radar fusing for anti-aircraft shells, the American formations bombing by daylight would have suffered proportionately.

By 1944 it had become clear to all but the dogmatists in Bomber Command and the US Eighth Air Force that strategic bombing would not win the war in Europe (just as in mid-1945 it seemed clear that the fire-bombing of the home islands would not beat Japan). The strategic bomber, like the submarine and the tank, had been revealed to be a weapon susceptible to counter-measures, a system that required expensive 'dedicated' defences to protect it and a victim of attritional losses which imposed a heavy and continuing charge on war production. If there was such a thing as a revolutionary war-winning weapon, the search for it lay in another direction.

### — Hitler's 'revenge weapons' —

In one field of the search, the Germans had made greater progress than any of the other combatants. They were on the point of deploying a ballistic missile. German pilotless weapon research had an extended history, much of it intertwined with the life stories of two individuals, Werner von Braun and Walter Dornberger. Von Braun was a professional technologist whose youthful enthusiasm for the idea of space travel had translated itself by the late 1920s into practical experimentation with rockets. Dornberger was a regular gunner officer who had served with the heavy artillery in the First World War and in 1930 was charged with rocket development at the Army Weapons Office. Circumstances brought the two into contact and in 1932 they began to experiment together with rocket firings. Braun supplied the technical expertise, Dornberger defined the practical criteria a successful rocket would have to meet. 'I had been a heavy gunner,' he wrote. 'Gunnery's highest achievement to date had been the huge Paris Gun', which fired 'a 21-cm shell with about 25 lb of high explosive about 80 miles. My idea of a first big rocket was something that would send a ton of high explosive over 160 miles.' He also 'stipulated a number of military requirements, among others that for every 1000 feet of range a deviation of only 2 or 3 feet [from the chosen impact point] was acceptable.' He finally 'limited the size of the rocket by insisting that we must be able to transport it intact by road and that it must not exceed the maximum width laid down for road vehicles.'

Dornberger's prescription revealed both the institutional roots of his thinking and, at



the same time, an astonishing prescience of the rocket's potential. His insistence on road transportability went back to the characteristics of the 305-mm and 420-mm guns with which the German artillery had devastated the Belgian forts in 1914; it ensured that future German ballistic missiles would be weapons of the artillery arm. His requirements for range, accuracy and size of warhead, on the other hand, cast German rocket research far into the future. What he demanded, in effect, was a prototype for the transportable ballistic missile which has become the principal strategic weapon of the superpowers in the late twentieth century. When, later, he was to insist that the successful production model (known to the Germans as the A-4, to the Allies as the V-2) should move on a vehicle (the Meillerwagen) which was also its launcher, he ensured the appearance of the 'transporter-erector' which in our own time has made the Soviet SS-20 and the American Pershing 2 instruments of strategic power so 'survivable' that their existence has produced the world's first ever categorical agreement of disarmament between leading military powers.

The German army's decision to invest in rocket development was motivated by the provisions of the Versailles treaty, which forbade it to possess heavy artillery but did not proscribe rockets. By 1937, however, when work on the V-2's predecessors was sufficiently advanced for Braun and Dornberger to have secured funds to establish a testing station on the Baltic island of Peenemünde, Hitler had already breached the Versailles treaty at every point. The rocket team's current preoccupation was to sustain funding to continue research. The army favoured the programme, since the V-2 was to be an army weapon, and provided finance. In October 1942 a successful test firing was staged, in December Speer, the Armaments Minister, authorised mass production, and on 7 July 1943 Hitler, after viewing a film of a missile launch, designated it 'the decisive weapon of the war' and announced that 'whatever labour and materials [Braun and Dornberger] need must be supplied instantly.'

By 1943, however, the British were already aware that the German ballistic missile programme was well advanced. Warning from a still-unidentified German wellwisher, received in Norway in 1940 and known as the 'Oslo Report', had alerted London to the existence of a missile research programme. The trail had then gone cold, but had revived when new evidence suggested in December 1942 that a ballistic missile was under development in Germany and, in April 1943, that the Luftwaffe was also experimenting with a pilotless aircraft. Both clues came from 'Humint' (human intelligence, or the word of agents' contacts), one of its few successes of the war. By June both German programmes had been identified as centring on Peenemünde, where in fact the Luftwaffe was developing the FZG-76 (V-1 flying-bomb) at one end of the island while Dornberger and Braun worked on the V-2 rocket at the other. On 29 June Churchill personally ordered Bomber Command to take Peenemünde under heavy attack and on the night of 16/17 August it was attacked by 330 aircraft and devastated.

The Peenemünde raid so gravely set back the German pilotless weapons programme that it was not until 12 June 1944 that the first flying-bomb landed in Britain; 8 September

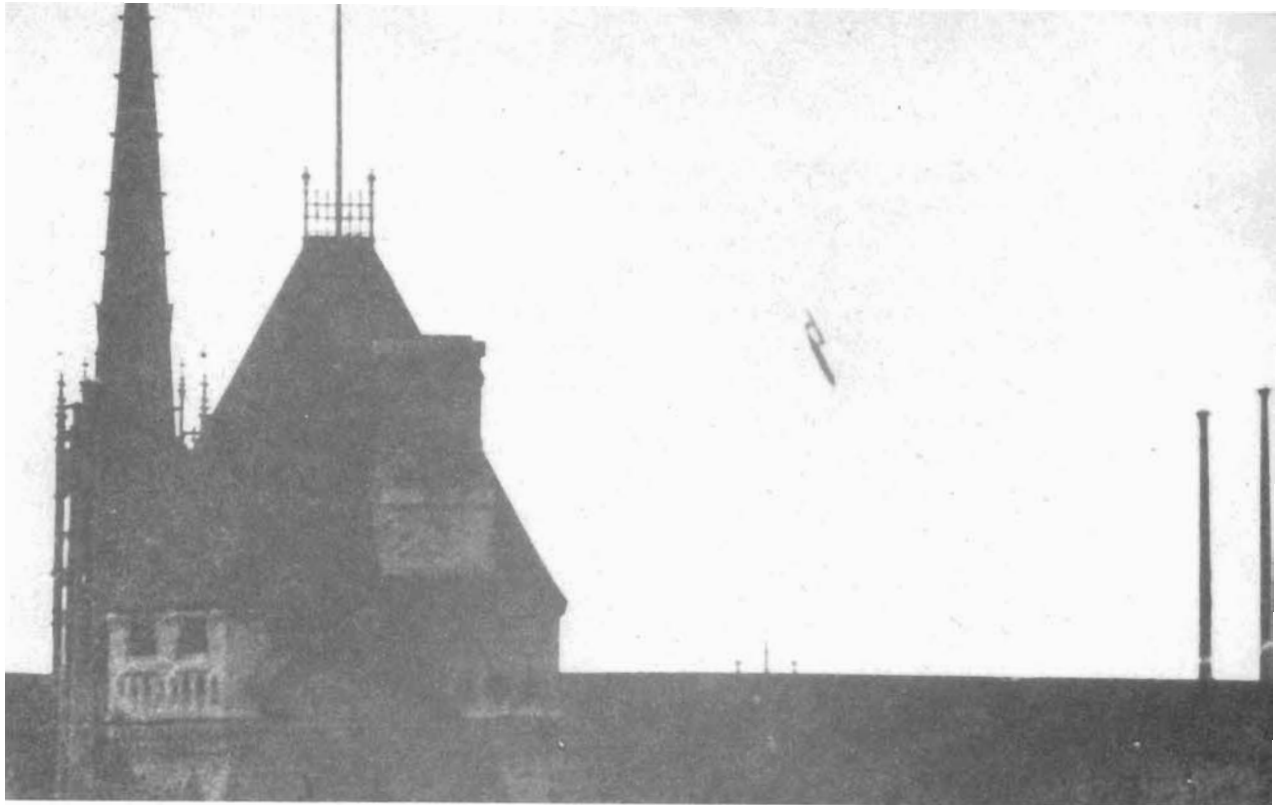
was the date of the first successful V-2 rocket attack. By then the Luftwaffe's 155 Regiment had been driven back from the positions whence its V-1s could reach England; as a result, out of the 35,000 produced, only 9000 were fired against England and of these over 4000 were destroyed by anti-aircraft fire or fighter attack. The V-2s were never fired from their chosen launch sites in northern France; from Holland they could just reach London, on which 1300 impacted, and after October an equal number were directed at Antwerp, which by then was the Allied Liberation Armies' main logistic base.

The V-2s killed 2500 Londoners between 8 September 1944 and 29 March 1945, when their launch positions were finally overrun by the 21st Army Group. Britain had had a lucky escape – and perhaps also America, for Braun and Dornberger had already written the specifications for a missile, designated the A10 and utilising the V-2 (A-4) as its second stage, which would have had a range of 2800 miles and been launched across the Atlantic. Under other circumstances, moreover, these missiles, to which the Allies had not even the beginnings of a counterpart and no counter-measure whatsoever, would have carried a warhead as revolutionary in nature as the missiles were themselves. For Germany too had its atomic weapons programme.

It was the crowning mercy of the Second World War that it came to nothing. For a complex of reasons, which included Nazi Germany's self-deprivation of significant scientific talent by its persecution of the Jews, but also the inefficient multiplication of research programmes by as many as a dozen agencies which all hoped to win the Führer's favour by bringing him news of the successful development of the super-weapon, the American atomic intelligence team which ransacked Germany in May 1945 found that 'they were about as far as we were in 1940, before we had begun any large-scale work on the bomb at all'. In the last months of his life, Hitler, whose enthusiasm for nuclear weapons, as for ballistic missiles, developed too late in the war to ensure their decisive operational deployment, attempted to revitalise those about him with promises of unanswerable vengeance on his enemies. However, the evidence showed that, 'although [he] had been advised of the possibility of an atomic weapon in 1942, the Germans had failed to separate U 235 [the essential fissile element] and that, while they had apparently started separation on a small scale by means of a centrifuge and were constructing a uranium pile, they had only recently succeeded in manufacturing uranium metal . . . and had not by August 1944 taken their experiments to the point at which they were aware of the difficulties they would have to overcome before the pile would function.'

In short, the Germans were years from manufacturing an atomic bomb at the time when the Allied atomic weapons programme was already close to fulfilment. In October 1939 Albert Einstein, then the most famous man of science in the world and an émigré to the United States, had nevertheless been prompted by two younger physicists to write to

**Above:** A V-1 plunges to earth in central London. **Right:** The scene in Clapham on 17 June 1944 after a V-1 attack.

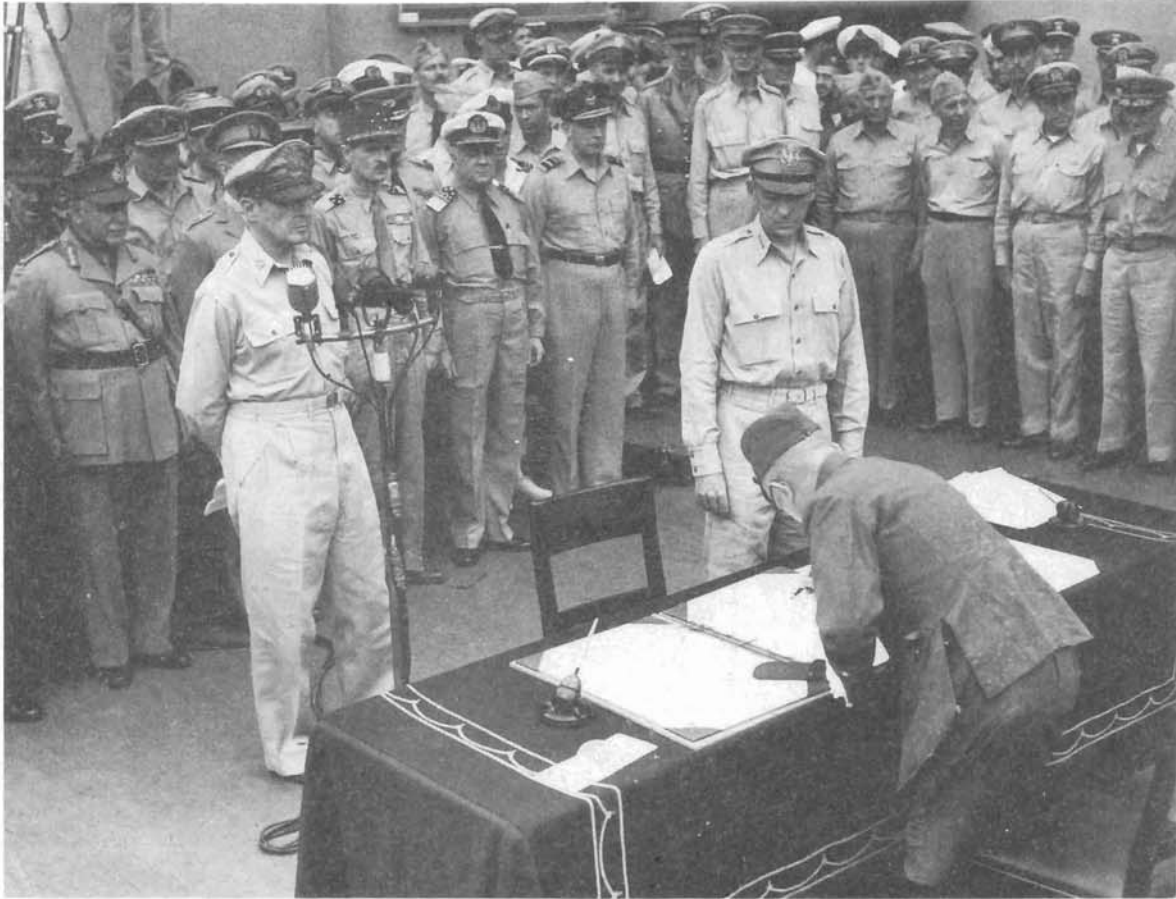


President Roosevelt warning that Germany might be bent on an atomic weapons programme and suggesting that the United States should study the possibility itself; Roosevelt 'set up a 'Uranium Committee', which reported in July 1941 that the project was feasible and, if so, would be 'determining'. In 1942 the British, who had been pursuing their own researches with excellent manpower but insufficient funds, amalgamated their efforts with those of the Americans in the United States. By 1945 120,000 people were employed by the Manhattan Project, which had succeeded in separating uranium 235 and the synthetic element plutonium and in developing mechanisms to explode both as warheads of bomber-borne weapons.

It was the uranium 235 version of this atomic bomb that the B-29 *Enola Gay* dropped over Hiroshima on the morning of 6 August 1945; a few hours later, while 78,000 people lay dead or dying in the ruins, a White House statement called on the Japanese to surrender or 'they may expect a rain of ruin from the air'. No word being received, on 9 August another B-29 flew from Tinian to bomb the city of Nagasaki, killing 25,000. The United States thus temporarily exhausted its supply of nuclear weapons and awaited the outcome of the damage done.

On 8 August, following a warning it had issued in April that it would repudiate its 1942 non-aggression treaty, the Soviet Union declared war on Japan and opened a vast offensive into Manchuria the following day. This offensive had been promised to the Western Allies, but the Americans had grown decreasingly enthusiastic for it as the moment to launch their atomic strike approached. Stalin had shown little surprise when told by Truman at Potsdam of America's 'secret weapon'; as we now know, the treachery of certain Western scientists, in particular the German communist émigré Klaus Fuchs, had revealed its existence to the Soviets already. Marshall, the American chief of staff, was particularly insistent that Russian intervention was no longer necessary to the success of the Allied cause and would win them advantages in the Far East which the United States would find cause to regret. He equally admitted that there was no means of deterring the Russians from their offensive, which had been in preparation ever since the German surrender. Three Far-Eastern Army Groups had been formed from the best-equipped and most experienced veterans of the European campaign, the third under the famous Marshal R. Y. Malinovsky. They were highly mechanised, the Japanese Kwantung Army was not. Though 750,000 strong, and regarded as the best formation in the imperial army, it had little recent experience of fighting. It bitterly defended the approaches to the central Manchurian plain, but when the Soviet Sixth Guards Tank Army broke out into open country on 13 August large sections of it were rapidly enveloped. The remainder was driven back across the river Yalu into northern Korea, where fighting continued until a final Japanese collapse on 20 August.

By then the Japanese forces everywhere else within the Pacific war zone had made their surrender to whichever Allied troops were at hand. On 15 August Emperor Hirohito, in the first public speech a Japanese sovereign had ever made, broadcast to his soldiers,



*MacArthur watches the Japanese surrender, Tokyo Bay, 2 September 1945.*

sailors and people to announce that his government had decided to treat with the enemy. Explaining that the war 'had turned out not necessarily to Japan's advantage' and that the enemy had begun 'to employ a new and most cruel bomb', he called upon them, in a series of strange and obscure phrases which never mentioned surrender, to accept the coming of peace. A few intransigents disobeyed and attempted briefly to continue the fight; a few irreconcilables committed ritual suicide. The rest of the emperor's seventy million subjects relapsed instantly into the posture of defeat. On 28 August MacArthur arrived at Yokohama to institute the American occupation and reconstitution of Japan. On 2 September, aboard the battleship *Missouri* lying in Tokyo Bay, in the presence of representatives of Britain, the Soviet Union, China, France, Australia, New Zealand and Canada, MacArthur and the Japanese Foreign Minister, chief of staff and chief of naval operations signed the instrument of surrender. The Second World War was over.