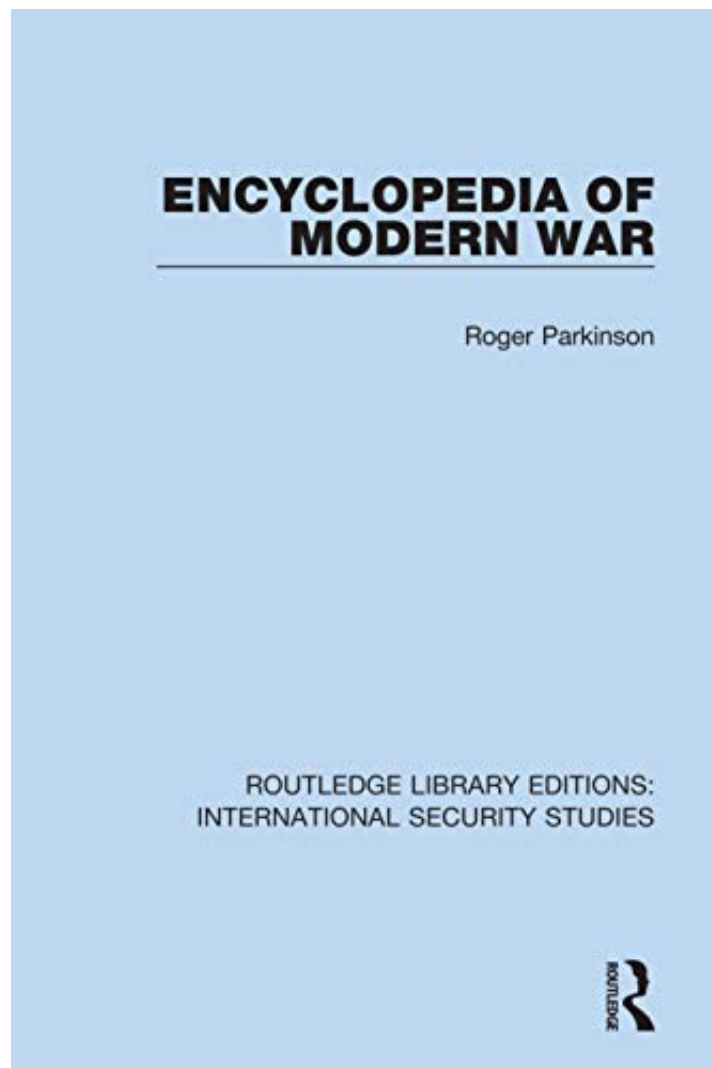


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Encyclopedia of Modern War (Routledge  
Library Editions: International Security Studies  
Book 5)

*by*  
Roger Parkinson



## **Synopsis**

This book, first published in 1977, presents a comprehensive survey of the upheavals experienced in warfare from 1793 to the end of the twentieth century, a period that saw many fundamental changes – from the Napoleonic wars to the advent of total war, guerrilla and nuclear warfare. It discusses in detail the main aspects of warfare – battles, weapons, and people. It concentrates equally on all three, not emphasising one aspect at the expense of the others, and allowing cross-references between them so as to fit them into the general pattern of development. Also included are other factors essential to an understanding of modern warfare, such as technological items, and conceptual entries such as basic strategy and tactics, and various military theories and principles.

## Look inside the book

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ENCYCLOPEDIA OF MODERN WAR  
ENCYCLOPEDIA OF MODERN WAR  
ROGER PARKINSON  
First published in 1977 by Routledge & Kegan Paul Ltd  
This edition first published in 2021 by Routledge  
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN  
and by Routledge  
52 Vanderbilt Avenue, New York, NY 10017  
Routledge is an imprint of the Taylor & Francis Group, an informa business  
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British Library Cataloguing in Publication Data  
A catalogue record for this book is available from the British Library  
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ENCYCLOPEDIA OF MODERN WAR  
First published in 1977 by Routledge & Kegan Paul Ltd  
39 Store Street, London WC1E 7DD and Broadway House, Newtown Road, Henley-on-Thames, Oxon RG91 1EN  
Set in Monotype Century Schoolbook by Kelly & Wright, Bradford on Avon, Wiltshire and printed in Great Britain by Lowe & Brydone Ltd  
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To H.G.P. with appreciation and gratitude  
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PREFACE  
This is the first single encyclopedia to bind together the main threads involved in the development of war, 1793-1975. Previous military reference books have concentrated on battles or weapons or personalities; this has been compiled in an attempt to cover all three, plus other aspects equally essential to an understanding of modern war, including conceptual topics such as strategy, tactics and various theories and principles. The aim has been to produce a book providing a reference framework to the factors involved in the convulsion of warfare during this period; one aspect relates to another to give a more comprehensive coverage. Vigorous selection has obviously been required to keep the book within a reasonable length. As many items have been rejected as chosen, and those included have been subjected to ruthless restraint. It is nevertheless hoped that all major topics are dealt with, both for an overall outline and as a means for further exploration. I express my gratitude to all those who helped with the compilation of the entry list, especially Brian Bond, King's College, London, Michael Elliot-Bateman, Manchester University, and Gwynne Dyer, Sandhurst. I only regret that many of their exhaustive suggestions could only be included as part of other items; responsibility for the selection, of course, rests entirely

upon myself. I needed more help from my wife Betty with this book than with any other: as always, her response proved greater than all possible expectation. Words in italics refer to other relevant entries where more information can be obtained. The following abbreviations have been used: AEF (American Expeditionary Force), ANZAC (Australian and New Zealand Army Corps), AOC (Air Officer Commanding), BAOR (British Army of the Rhine), BEF (British Expeditionary Force), C-in-C (Commander-in-Chief), GPMG (General Purpose Machine-gun), GOC (General Officer Commanding), ICBM (Inter-Continental Ballistic Missile), IRBM (Intermediate Range Ballistic Missile), LMG (Light Machine-gun), NATO (North Atlantic Treaty Organization), OKH (Oberkommando des Heeres, German Army High Command,) OKW (Oberkommando der Wehrmacht, German High Command of all three services), OSS (Office of Strategic Services), SA (Sturmabteilung, German stormtroopers), SACEUR (Supreme Allied Commander, Europe), SHAPE (Supreme Headquarters, Allied Powers in Europe), SOE (Special Operations Executive), SS (Schutzstaffel), STOL (Short Take-off and Landing), RFC (Royal Flying Corps), VTOL (Vertical Take-off and Landing).

**Absolute war** Concept marking an extension of total war. The latter is a conflict harnessing all national resources - economic, financial, technological - to the furtherance of military aims, but with these aims nevertheless politically motivated. Absolute war is one in which political aims are smothered; when military power becomes overriding at the expense of political control. On a lower level total war represents the involvement of civilians in war, as opposed to campaigns merely being waged against other armies with civilians largely unaffected. Sherman's march to Atlanta in 1864 was total war; indeed Grant's whole campaigning policy can be considered total, but it stopped short of being absolute: Grant remained subordinate to the President, Lincoln. War approached absolute form in the First World War: the generals achieved supremacy, especially the Hindenburg-Ludendorff partnership in Germany. Clausewitz warned against such military dominance and in doing so defined absolute as opposed to total war: Policy ... is interwoven with the whole action of War and must exercise a continuous influence upon it. . . . War can never be separated from political intercourse, and if this is done in any way ... we have before us a senseless thing without an object. Nuclear warfare, with no possible achievable political aim for either side, would be absolute.

**Aden** Area of last fighting involvement of British troops during the withdrawal from 'East of Suez', a policy undertaken from 1964 in the abandonment of former Empire territory. The last British servicemen left Aden on 29 November 1967, after 128 years of British rule. Hostilities by insurgents had begun in 1963, aided by groups in the Yemen, and reached a peak in the final year with 2,600 incidents. From December 1963 to November 1967, 135 British servicemen were killed. British rule ended with the granting of independence to South Arabia, later the South Yemen Republic.

**Airborne forces** Paratroop operations first came near to reality in early 1918, when the US Army Air Service officer Mitchell gained Pershing's approval for dropping men of the 1st US Infantry Division behind German lines, but this operation was superseded by the ending of war. Chennault in the USA demonstrated the use of paratroops in 1925 and 1928 but failed to receive official backing. In 1927 the Russians became the first to drop airborne troops in combat, operating against tribesmen in Asia. Russian developments were further stimulated by Tukhachevsky in the early 1930s and an independent Russian parachute division was created; Wavell watched a Russian exercise in 1936, but his report attracted insignificant attention in the British War Office. Tukhachevsky was executed in 1937 during Stalin's purges and the Russian airborne programme lapsed. Meanwhile the Germans had formed an experimental airborne staff in 1935 under General Kurt Student; an airborne division, the 7th, appeared in 1939. German paratroops were first used during the invasion of Norway and Denmark in April 1940. On 10

May 1940 airborne troops were employed extensively in the invasion of Belgium, dropped from 450 aircraft, and German plans for the invasion of Britain, operation Sealion, envisaged up to 8,000 paratroops in the first wave. About 11,000 airborne soldiers from Student's 11th Air Corps were thrown into the battle for Crete, May 1941, but the heavy casualties suffered in the seizure of the island turned Hitler against the airborne concept. In June 1940 Churchill had urged the raising of 4,000 British airborne troops, and General Sir Frederick Browning was instructed in October 1940 to raise an airborne division. The first British airborne operation took place on 10 February 1941, when 38 parachutists blew up the Tragino Aqueduct, Italy. The USA formed the 501st Parachute Battalion in September 1940, and a Provisional Parachute Group was created in 1941. Three airborne divisions were employed in the Normandy landings, attempting to improve on methods already used in the invasion of Sicily in the previous year. In September 1944 the US 82nd and 101st Divisions joined with the British 1st for the unsuccessful operation against Arnhem. By 1945, 5 US airborne divisions and several independent airborne regiments had been created. The French sent 17 parachute battalions to Indochina - 11 of which were captured at Dienbienphu; between 1948 and 1954 the French carried out over 200 airborne drops. French paratroops were also used in Algeria where their élite status caused friction with the ordinary conscripts and helped play a part in the subsequent mutiny. In general, however, the paratrooper has reverted more to the role of ground infantryman: rather than parachute drops, forces are moved by helicopter, with this machine assuming increasing importance as an air transport vehicle - especially shown by the US operations in Vietnam. By contrast, during the US involvement in Vietnam only one tactical parachute operation was conducted. Parallel with the use of airborne forces has been the development of air portable equipment, designed with minimum weight, easily transferable parts and able to be dismantled as far as possible. Such equipment ranges from medical items to special aluminium vehicles and artillery: the largest Russian helicopter, the Mi-12, set an official record by lifting loads of nearly 40 tons. Artillery designed for an airborne role includes the US 105 mm howitzer M.102, transportable in the Caribou fixed-wing aircraft or in the Chinook helicopter.

Aircraft At the end of the eighteenth century the British inventor Sir George Cayley produced designs for model heavier-than-air craft, and he constructed a 5-foot model glider in 1804. In doing so Cayley laid down the basic principles which lay behind the earliest aircraft, including the method whereby a sturdy wing structure could be obtained by adopting a wire-braced biplane or triplane layout, and the use of dihedral angles between the wing pairs to improve aerodynamic stability. The French naval officer Felix du Temple designed and tested a monoplane in 1857 which had a propeller and was first equipped with a clockwork motor, later adapted to steam: this was probably the first heavier-than-air craft to take off and fly under its own power. The Wright brothers made the first successful flight in a motor-powered machine in December 1903. By 1914 all major participants in the First World War had developed rudimentary air power: Germany was credited with 12 aircraft 'factories'. France had 8 aircraft manufacturing establishments, with French development spurred on by the engineer and pioneer pilot Louis Blériot, 1872-1936, who made the first Channel flight in a heavier-than-air machine in July 1909. Britain's RFC was formed in April 1912 although with less than a dozen pilots. Machines possessed by all belligerent nations combined came to less than 2,000 in 1914, and these aircraft were nondescript types. Various specific categories soon emerged: single and dual seater fighters, observation aircraft and, by 1917, larger aircraft designed for bombing. Fighters included the French Nieuport and Spad; these had a top speed of 91 mph and 119 mph respectively; the British BE2C, with a top speed of about 90 mph; the German Fokker, which by 1917 had won control in the air with the introduction of a synchronized

system enabling the machine-gun to fire through the whirling propeller. Later aircraft included the British Sopwith Camel: this had a top speed of about 120 mph and carried 25-pound bombs. Bombers included the British Handley Page, the Italian Caproni and the German Gotha. Fighter squadrons were usually equipped with about 18 aircraft, observation and bombing squadrons with 12. Life expectancy for pilots was extremely short: the British had 1,300 aircraft operating in support of their armies at the beginning of the Second Battle of the Somme, 1918, but when fighting ended a few weeks later only 200 remained. Nevertheless, by 1918 the allies had about 8,000 aircraft against the enemy's 3,300. Naval air power was also being developed: the age of the aircraft carrier had opened, and the British Fleet Air Arm came into being in 1924. Post-war developments covered the establishment of organizations specifically concerned with air power - the RAF was created from the RFC in the last months of the war and the Luftwaffe emerged after 1933 - or the establishments of organizations still linked with the Army, as for example the US Army Air Force. Yet apart from Germany, the major powers failed to develop air power to a sufficient degree prior to 1939, despite the pleadings of theorists such as Douhet and Mitchell. The Second World War saw the emergence of air power through strategic bombing already advocated by men such as Britain's Trenchard, through the greater fighter conflicts such as the Battle of Britain, and through close ground support as epitomized by blitzkrieg. The British designer Frank Whittle had studied the concept of jet propulsion during the 1930s and the Gloster-Whittle E28/39 flew for the first time in May 1941. The first flight of a jet aircraft had already been made by the Germans, with the Heinkel He 178 in August 1931, which led to the Messerschmitt Me 262. From the British development emerged the Gloster Meteor, in service with the RAF in 1944. Aircraft entered the supersonic age in October 1947 when Captain Charles Yeager of the USAF flew a specially built Bell X-1 rocket aircraft beyond the speed of sound - the so-called Mach 1. The term Mach 1 represents 760 mph at sea level, falling to about 660 mph at 36,000 feet and above. Latest developments have been to increase maximum speeds to the region of Mach 8, and to introduce greater versatility through STOL (short take-off and landing) and VTOL (vertical take-off and landing) aircraft. Aircraft have been developed specifically for various definite roles. Examples include carrier-based aircraft (the British Buccaneer, the US A6A Intruder and the British Sea Vixen); maritime reconnaissance aircraft (the Canadair and the RAF Nimrod); tactical fighters, fighter-bombers and interceptors (the US F111A, the RAF Hawker Hunter, the USSR MiG 21); tactical bombers (the RAF Canberra Mk 8, the USSR Ilyushin 'Beagle'); strategic bombers (the US Stratofortress B52H, the French Mirage IVA, the RAF Valiant and Vulcan, the USSR Tupolev 'Bear' and 'Blinder'); and multi-role aircraft such as the RAF Lightning, the French Mirage FI, the US F-104G Starfighter and Phantom. Another recent development has been the effort at joint production between allies to reduce costs and to introduce greater interchangeability: an example of such a project is the Anglo-French Jaguar, a single-seat light tactical support aircraft capable of Mach 1.8 at 36,000 feet.

**Aircraft carriers** In 1906 the German Navy began to take an interest in the Zeppelin airship for naval reconnaissance, and in April 1908 definite proposals were made within the German Admiralty for such machines as scouting vehicles. Interest was also being expressed in Britain and America over the possibilities of heavier-than-air craft to provide the fleet with eyes, to act as attacking weapons against other warships, and as a defensive screen. It immediately became apparent that in order to operate at fullest possible effectiveness such aircraft should be provided with a base within the fleet itself. From this realization emerged the aircraft carrier - a vessel which eventually proved capable of asserting local naval superiority and in doing so superseded the battleship as the most powerful capital warship. Rather than being a subsidiary of the fleet, the aircraft carrier

developed to the extent that it gathered around itself a fleet dependent upon it. The aircraft carrier remains predominant today, despite fears of its vulnerability against missiles; it continues to display its effectiveness in terms of mobility and flexibility, carrying with it the advantage of avoiding the need to establish land bases with their consequent diplomatic entanglements. The first successful flight from platforms rigged on a ship's deck was made by the US airman Eugene Ely in 1911. On 1 January 1912 the British pilot Charles Samson flew his Short airplane from a track constructed on the bows of the cruiser HMS 'Africa'. In 1913 the crude prototype of an aircraft carrier, the converted cruiser HMS 'Hermes', launched her aircraft during trials: 'Hermes' had an abbreviated flying-off deck and 3 aircraft. The same year conversion began on a tanker to give a larger deck space for 10 seaplanes: this warship was commissioned the HMS 'Ark Royal' in 1915. The original 'Hermes' sank after being torpedoed in the Channel in October 1914; her successor, completed in 1919, was the first vessel specially designed as an aircraft carrier. During the First World War the British established the Royal Naval Air Service, merged with the RFC into the RAF in 1918 but separating again in 1924 as the Fleet Air Arm. The first US carrier was the 'Langley', put into service soon after the First World War. Japan had two aircraft carriers by the time the Washington Naval Treaty of 1921 restricted naval tonnage. Development throughout the inter-war years culminated in the Royal Navy's 'Ark Royal', commissioned in 1938 and incorporating all latest features: arrester wire to halt incoming aircraft, net crash barrier, batsmen to guide pilots in and catapults. The latter system had first been suggested in 1914 and the first successful trial took place in 1917. In September 1939 Britain had 10 carriers, while France and Germany had only 1 each. At the time of Pearl Harbor, December 1941, America had 3 carriers in the Pacific - 'Enterprise', 'Lexington' and 'Saratoga' - while Japan had 11. The naval war in the Pacific revolved around these warships and American production soared from 3 carriers in 1942 to over 100 by the end of the war. Coral Sea, May 1942, marked the first great carrier battle; Midway, June 1942, resulted in the loss of the Japanese main carrier fleet. Post-war developments have included the angled flight-deck, which permits aircraft to land whilst others are taking off - a British idea but with the Americans incorporating the first angled deck in the training carrier 'Antietam'; the mirror-sight landing device; the steam-powered catapult. The latter two innovations were also British ideas, rapidly taken up by the Americans. Britain herself decided in 1967 that her fixed-wing carrier force would be phased out. By 1973 Britain had only one fixed-wing carrier left in service, plus commando carriers equipped with helicopters. The pride of the US fleet was the first nuclear-powered carrier, 'Enterprise', the largest aircraft carrier ever built - standard displacement was 75,700 tons. This vessel was completed in December 1961; cruising range was equivalent to twenty times round the world; the vessel cost about £158,570,000; aircraft complement was up to 100. A second nuclear-powered attack carrier (CVAN), the 'Nimitz', entered service after the 'Enterprise', with two more planned. Russia neglected carrier production until she decided to build one 40,000-ton Kiev-class vessel, probably designed for 25 short/vertical take-off and landing aircraft (S/VTOL) or 36 helicopters; this warship was expected to be in service during 1976-7, with a second vessel being built.

Airship As early as 1852 a steam 'dirigible' managed to fly for a short period, but its speed of only 6 mph meant that it would be unable to counteract even the slightest wind. 'La France', built in 1884 and driven through electric power, obtained a faster speed but exhausted its battery within 5 miles. As with aircraft, adequate development had to await the internal combustion engine. In 1898 the Brazilian-born Alberto Santos-Dumont, living in Paris, merged the balloon with a petrol-driven machine; in the same year Count Ferdinand von Zeppelin (1838-1917), who had served in the Union Army during the American Civil War and in the Austro-Prussian and Franco-

Prussian conflicts, established an airship factory at Friedrichshafen, Germany. In July 1900 the first Zeppelin airship, LZ1, flew at Lake Constance: this, driven by two 15 hp Daimler engines, moved at 16 mph; Zeppelin had constructed the contraption on a solid framework known as a 'rigid', unlike earlier efforts which still resembled balloons. The second rigid airship, LZ2, was completed in 1905 with more powerful engines giving 170 hp: this machine was wrecked on her second flight in June 1906, but had succeeded in reaching a height of 1,800 feet and a speed of 26 mph. Also in 1906 Santos-Dumont flew his craft round Paris in a 30-minute circular tour. LZ3 was completed in October 1906, and stayed airborne for 8 hours during tests. LZ4 appeared in June 1908, built to German Army specifications: she flew over the Alps, but was still too slow and fell victim to a thunderstorm. LZ5 flew a distance of 820 miles in May 1909 and was accepted by the German Army. Progress in Britain proved slower. The Army Balloon factory at Farnborough completed the 'Nulli Secundus' in 1908, which was non-rigid and ungainly, although managing to fly at 16 mph. Vickers, working in conjunction with the British Admiralty, began work on Naval Airship No. 1 or 'Mayfly' in 1909, yet this craft was not completed until 1911 and then proved totally unsatisfactory. The Admiralty rejected the airship idea for a few months, but work started again in 1912. By 1914 the German armed forces had 30 dirigibles, all Zeppelins; the French had 10 and the British 7. The latest Zeppelin, LZ130, completed in May 1914, had engines totalling 630 hp, an endurance range of 30 hours or 1,500 miles, a crew of 20 and a top speed of just over 47 mph. Zeppelin raids were conducted over France and England in 1915 and early 1916; the heaviest attack took place on London on 13 October 1915, and the last on 5 August 1918. In doing so the Zeppelins initiated a new form of aerial war. Two flights of Zeppelins were flown at the Battle of Jutland, but were unable to have positive influence owing to poor visibility. Fighter aircraft soon revealed the vulnerability of airships: the first Zeppelin was shot down over England on 3 September 1916; 2 more were destroyed by ground fire on 26 September, and others soon followed. Sixteen Zeppelins survived the war: 8 were turned over to the allies, 1 was dismantled and the remaining 7 sabotaged in June 1919. The Zeppelin Company was allowed to build 2 small commercial craft, but these were also handed over to France and Italy.

Alamein, El, Battles of, July and October 1942 Second World War (Map 14). Rommel advanced into Egypt with all possible speed after his victories at Gazala and Mersa Matruh in late spring, but clashed with Auchinleck's 8th Army on 1 July at the hastily improvised El Alamein positions; this, the First Battle of El Alamein, saw the loss of Rommel's initiative in the desert campaign. His supply lines were overstretched; the British Desert Air Force was reaching maximum effectiveness - during the battle the RAF flew over 15,000 sorties. The Afrika Korps advanced in the early hours of 1 July only to be stopped by unexpectedly determined artillery fire; Rommel's Italian allies made no progress in a simultaneous thrust farther north. The balance began to shift in Auchinleck's favour on the 3rd, and although the battle continued in varying intensity throughout the month the British commander could claim success by 7 July. Auchinleck introduced improvements into the 8th Army battle-tactics during the battle, which were to become increasingly important: these included more effective use of concentrated artillery fire and the deployment of British armour en masse rather than piecemeal, with the tanks drawing the Germans on to their line - a tactic previously used in devastating fashion by the Afrika Korps. Montgomery took over command of the 8th Army on 11 August, after Churchill's original choice, General W. H. E. Gott, was killed; Alexander took over Auchinleck's other superior role as GOC-in-C Middle East. Rommel, faced with a growing imbalance in strength, attacked on 31 August in an attempt to break through his enemy's defence at Alam el Halfa. His plan was typically bold: to hold in the north, feint in the centre and punch through the south. Rommel



relied on speed and surprise. However, Montgomery had already managed to impose his vigorous will over the 8th Army and he continued the improvements introduced by Auchinleck. Deployed in crucial defensive positions at Alam al Halfa ridge, to the rear of the British minefields, was General Sir Brian Horrocks's 13th Corps, preventing Rommel from outflanking the defences. Rommel was obliged to thrust against this ridge; he found the task impossible and started to pull back on 3 September. Montgomery allowed the enemy to retreat, wishing to preserve the 8th Army intact for the decisive Second Battle of El Alamein. By the beginning of October the 8th Army had an awesome preponderance of power: twice as many troops (almost 200,000 to 50,000 Germans and 54,000 Italians), twice as many tanks (1,000 compared to about 500) and similar artillery figures. The Desert Air Force numbered about 530 serviceable aircraft compared with about 150 German and 200 Italian. Montgomery envisaged his infantry breaking two main corridors into the enemy infantry defences: 30th Corps in the north and 13th Corps farther south. British armour would follow the infantry into the breaches to defeat the enemy tanks. Montgomery told his commanders to plan for a 'dog-fight' of a week, with the total battle lasting about 10 days - later amended to 12; this proved correct. At 9.40 p.m. on 22 October, about 800 British guns opened a tremendous barrage in an attempt to blanket the Axis artillery. The battle, code-named operation Lightfoot, moved almost immediately into the infantry assaults. Rommel was away from the area, returning on 25 October from consultations with Mussolini and Hitler. On 28 October, after 6 days of full-scale battle, Montgomery changed his plans: he decided to turn his southern thrust, where the 13th Corps had become bogged down, entirely over to the defensive, thus allowing more divisions to be placed in reserve. These would be used for an attempt to smash through the northern - 30th Corps - area, with this operation code-named Supercharge. Montgomery intended to aim this hammer blow on the faltering Italians. At 1 a.m. on 2 November the offensive began on a 4,000-yards front. By nightfall on 3 November the Afrika Korps had been reduced to a mere 30 tanks. Shortly before dawn, 4 November, Rommel ordered retreat. Only about 36 out of 249 German tanks were left on 4 November and only half the Italian total of 278. Axis killed and wounded probably totalled about 20,000; the 8th Army lost 13,000 and 432 tanks had been put out of action.

Alexander, Sir Harold Rupert, 1st Earl Alexander of Tunis, 1891-1969 British Field-Marshal. Served in France, 1914-18; Northwest Frontier, India, 1935; Commander, 1st British Division, 1938-40; C-in-C Burma, February 1942 to August 1942, replacing Auchinleck as C-in-C Middle East. Alexander was appointed Deputy Allied C-in-C North Africa, February 1943, under Eisenhower and Supreme Allied Commander Mediterranean, November 1944, responsible for the continued conquest of Italy.

Algeria, revolt in, 1954-62 France conquered Algeria after a campaign beginning in 1830, and eventually almost a million French and other Europeans settled in the country. Demands for Algerian autonomy from the French were made soon after the Second World War; the major nationalist organization, the Front de Liberation Nationale (FLN), was established in 1951, but the call for independence was countered by the long-held French policy of seeking to integrate the country with metropolitan France. The first major clash between nationalists and security forces took place on 8 May 1948, but not until 1954 did the FLN launch a full-scale guerrilla war. French troop reinforcements led to an army of 450,000 in the country, including elite paratroop units. Amongst counter-guerrilla methods was the attempt to close the Algerian borders against FLN incursions from Morocco and Tunisia: along the latter frontier the French established the Morice Line, comprising two rows of electric fencing and barbed wire, separated by minefields and guarded by radar posts. The population was forcibly evacuated from some adjacent areas, the land being designated as free-fire zones where civilians could be shot at sight. Inside Algeria the French covered large areas with a grid

or checkerboard of garrisons and fortified posts, with this system of close territorial control known as 'quadrillage'. In the latter stages of the war about 300,000 troops were committed to territorial defence, either deployed in static positions or in mobile interception roles. One feature of the war was the increasing brutality displayed by both sides, together with the use of torture. In June 1958 the French authorities admitted that security forces had tortured Algerians and clear evidence constantly emerged of widespread atrocities. One colonel in charge of a detainee camp admitted the use of torture, claiming that 'the fight against terrorism makes certain methods of interrogation indispensable as the only way to save human lives and avoid new attacks', and this attitude seemed common. Nevertheless the FLN remained strong, and the war itself became increasingly complicated by other factors. The FLN received support from the Arab states, and French resentment at Egyptian actions contributed to the 1956 Suez conflict. In 1958 frustration over failure to put down the FLN led to increasing unrest among the settlers in Algeria. On 13 May there began a revolt by French officers protesting against the political handling of the war and led by the paratroop general Jacques Massau. The French government was overthrown in the subsequent outcry; the army in Algeria, spearheaded by the paratroop units, was in a virtual state of mutiny, insisting that Algeria must be considered as part of France and that there must be no compromise with the FLN. On 1 June 1958 De Gaulle was returned to power, becoming President of the Fifth Republic on 21 December with a new constitution providing him with increased powers. He attempted to organize a referendum on the question of self-determination, but this alienated the extremist settlers, 'ultras', and the Algerians of French descent, 'pieds noirs'. These extremists joined with French military personnel to form the OAS secret army, pledged to keep Algeria under French control, and terrorism reached increasingly brutal proportions. De Gaulle visited Algeria in an attempt to calm the situation, but although he managed to restore French governmental control over the OAS, the FLN terrorism continued. On 22 January 1960 opposers of De Gaulle's policy rioted in Algiers; the riots continued until 1 February when they were put down by loyal French units under General Maurice Challe. The latter himself turned against the central authorities, joining with General Raoul Salan in an army mutiny which broke out on 22 April 1961. This was quietened four days later and Salan escaped to the OAS. However, De Gaulle gradually came to terms with the FLN, despite the OAS stance; peace talks began in France on 20 May and negotiations led to the proclamation of a ceasefire on 3 July 1962, with Ahmed Ben Bella the premier. Internal unrest against Ben Bella led to his overthrow on 19 June 1965, his replacement being the former FLN fighter, Colonel Houari Boumédiène.

Allenby, Sir Edmund Henry, 1st Viscount, 1861-1936 British Field-Marshal. Served in Bechuanaland, 1884-5; Zululand, 1888; and in Boer War, 1899-1902. Commanded British 3rd Army in First Battle of the Somme, June-November 1916, and in Battle of Arras, April 1917. Allenby relieved General Sir Archibald Murray as commander of British forces in Palestine, April 1917; his instructions were to 'take Jerusalem before Christmas'. He defeated the Turks at Beersheba, 31 October, and Junction Station, 13-14 November, entering Jerusalem on 9 December. Allenby resumed his offensive on 18 September 1918 and won a brilliant victory at Megiddo, 19-21 September. He entered Damascus on 1 October and Beirut the following day. Turkey signed an armistice on 30 October.

Alma River, Battle of, September 1854 Crimean War (Map 4) British, French and Turkish troops, totalling 52,000 men, began advancing on Sebastopol on 19 September. About 36,500 Russians made a defensive stand on the heights on the south of the Alma River, commanded by Prince Menshikov. The bank of the river was 15 feet high in places, with the hills beyond sloping to the Russian positions on a plateau, from which deadly fire could be directed down on an attempted assault. The offensive began on the 20th. Menshikov, confident

of his positions, had neglected to defend the steepest cliffs southwards on the coast, where a track was discovered and used by French troops. But then the French came under heavy fire from remaining Russian defences in this area; the French commander insisted the British should attack in the centre. Shortly after 3 p.m. Lord Raglan therefore gave the order for the advance on the heights. The assault covered a 2-mile front. The advance continued towards the Russian Great Redoubt despite the terrible bombardment. Incredibly, the Russian guns finally ceased to fire; Emperor Nicolas had ordered Menshikov to withdraw Russian artillery before it fell into enemy hands. The Light Division stormed and took the Great Redoubt, but support failed to arrive after the Duke of Cambridge, commander of the second line, delayed while he received more precise instructions from Raglan. During this confusion the Light Division was driven back. The second British line crossed the river, comprising the Brigade of Guards and the Highland Division commanded by Sir Colin Campbell. The Guards assaulted the Great Redoubt with the Highlanders on their left, and reached the summit. They then battered through massed Russian infantry to win the battle. The British cavalry, so far inactive, were in an excellent position to destroy the retreating enemy: Raglan refused to give orders for the pursuit, believing the cavalry too precious to be risked. Menshikov withdrew unmolested; the allies continued the march on Sebastopol prior to the Battle of Balaklava. Allied losses at Alma, mostly British, totalled about 3,000; Russian casualties were about 5,700.

American Civil War, 1861-5, general (Map 3) This was a war which spotlighted latest military developments: rifles, breech-loading and magazine infantry weapons including the machine-gun, especially the Gatling; railways and steam-power; rifled field artillery, sometimes breech-loading; the torpedo mine; ironclad warships; rudimentary submarines; balloon observations; telegraph. The conflict revealed that the industrial revolution had made the civilian responsible for providing the industrial means of war; the factory became as important as the battlefield. The north achieved victory because it survived the longest; the south collapsed because its war industry had been captured or dislocated. Modern fire power had begun to rob the battlefield of its ability to force the final conclusion: infantry weapons, and especially the machine-gun, had raised the killing range to about 500 yards and had vastly increased the rate of fire, so undermining the ability of the opposing force to overwhelm the enemy through massed bayonet charges. The superiority of defensive warfare had begun to emerge. The war was saved from becoming bogged down because of increased mobility provided by the railroad, and because information could be transmitted through the telegraph. Forces could be shifted more quickly and with greater effect, and armies were still sufficiently small to be able to penetrate gaps in enemy deployment - and also leave gaps in their own dispositions. Defeat at Bull Run, July 1861, meant the north lost the opportunity of ending the struggle in one blow, and the caution of the northern Union generals formed a contrast to Jackson's manoeuvring in the Shenandoah campaign, May-June 1862, leading to Malvern Hill. The supremacy of the southern Confederate leadership was underlined at the Second Battle of Bull Run in August, Antietam in September, Fredericksburg in December and Chancellorsville in May 1863. But Grant had begun to emerge: his leadership, combined with the greater northern resources, started to turn the tide, beginning at Shiloh in April 1862. While he built up strength in the west, Meade won the devastating victory over the Confederate hero Lee at Gettysburg, July 1863. Grant's determination resulted in the surrender of Vicksburg in the same month. The northern strategic campaign began to find cohesion under Grant and his able lieutenant Sherman, with the latter winning his first major victory at Chattanooga in November. In March 1864 Grant became Union General-in-Chief, and he planned his gigantic pincer movements which would disembowel the south. These two movements comprised the Wilderness campaign striking

towards the north and leading to the siege of Petersburg, and Sherman's celebrated march to Atlanta and then to Savannah. The pincers were beginning to snap shut when Lee was forced to surrender at Appomattox. About 2,210,000 men served in the Union forces during the war; about 140,000 of these died in battle, 281,881 received serious wounds, 224,000 died from other causes. Confederate estimates of men serving ranged from 600,000 to 1,500,000. It has been assessed that about 133,800 Confederates died in the war, plus up to 31,000 dying in Union prisons.

**American-Mexican War, 1846-8** Relations between the USA and Mexico deteriorated with the US annexation of Texas, at the latter's request, following the Texan War of Independence, 1835-6. Mexico insisted her territory extended to the Nueces River running towards San Antonio, Texas, while the USA claimed an area spreading south to the Rio Grande. US troops under Zachary Taylor advanced to the Rio Grande in March 1846, deploying opposite Mexican units at Matamoros. The latter attacked on 25 April prior to a general invasion under General Mariano Arista on 1 May which besieged Camp Texas. Taylor clashed with the enemy on 8 May in the Battle of Palo Alto, which resulted in a Mexican withdrawal. Next day Taylor forced the Mexicans over the Rio Grande in the Battle of Resaca de la Palma. Only on 13 May was war officially declared. Taylor crossed into Mexico 5 days later. He advanced south in August with 6,000 men, storming 10,000 Mexicans under General Pedro de Ampudia at Monterrey, 20-4 September, after which he agreed to a Mexican request for an 8-week truce. This agreement was repudiated by the US President, James Polk, and Taylor continued south to occupy Saltillo on 16 November. Further operations were hampered by disagreement in Washington over strategic plans. The US Army C-in-C, Winfield Scott, finally left Washington in late November to establish his HQ at Tampico prior to a move on Vera Cruz. Taylor was meanwhile ordered to adopt a defensive role during Scott's invasion; this was disrupted by the appearance in mid-February of a Mexican army under Santa Anna, advancing from San Luis Potosi. Santa Anna attacked on 22 February but was repulsed in the hard-fought Battle of Buena Vista after stubborn defence by US artillery under Bragg. This victory ended the northern campaigns of the war; the focus shifted to central Mexico. Scott landed on 9 March with 10,000 men and Vera Cruz fell on the 27th; Scott moved west, routing Mexican troops under Santa Anna at Carro Gordo on 18 April and occupying Puebla on 15 May. He advanced on Mexico City in early August, overrunning Mexican defensive positions at Contreras and Churubusco on the 20th. The US offensive resumed on 8 September with a bitter battle at Molino del Rey. Scott's troops took this defensive position, but the US strength was now down to about 7,500 men: Santa Anna had double this number. Scott nevertheless maintained pressure, taking the last major obstacle before Mexico City, Chapultepec Hill, on 13 September. The garrison at Mexico City surrendered next day. Peace talks led to the Treaty of Guadalupe, 2 February 1848, giving the USA possession of land up to the Rio Grande, including California, Nevada, Utah and large areas of Arizona, New Mexico, Colorado and Wyoming.

**American-Spanish War, 1898** US public opinion, incensed by Spain's brutal handling of insurrection in Cuba from 1895 to 1898, was further enraged when the US battleship 'Maine' exploded and sank in Havana harbour, 15 February 1898, with 260 men lost; Spain was accused of blowing up the warship; America declared war on 25 April. On 1 May, Commodore George Dewey's warships attacked the Spanish squadron in Manila Bay: this, 4 cruisers and 3 gunboats under Admiral Patricio Montojo was virtually annihilated. Manila capitulated after the arrival of US troops on 30 June. Meanwhile, Cuba had become the centre of operations. Spanish warships under Admiral Pascual Cervera reached Santiago de Cuba on 19 May; Admiral William T. Sampson, commanding the US Atlantic Fleet, immediately blocked the enemy in the harbour. On 22 June almost 17,000 US troops commanded by General William R.

Shafter began landing near Santiago against 35,000 enemy troops commanded by General Arsenio Linares; they met in the Battle of San Juan on 1 July. Fighting centred on two features known as Kettle Hill and El Caney Ridge, taken at a cost of about 1,500 US casualties, almost double the Spanish total. Admiral Cervera failed to break out of Santiago harbour in a naval engagement on 3 July; Santiago capitulated on 17 July. US troops under General Nelson A. Miles landed at Puerto Rico on 4 August and were engaging in a successful campaign when hostilities ceased with the Treaty of Paris, 10 December. Spain relinquished sovereignty over Cuba, ceded Puerto Rico and Guam to the USA and sold the Philippines to the USA for \$20 million. The war, although successful for America, revealed deficiencies in the US armed forces, as did disturbances in the Philippines from 1899 to 1902. These failings stimulated reform under Secretary of War Elihu Root.

American War of 1812 (1812-15) (Map 2) Britain encroached US neutrality at sea during the seriously naval war against Napoleonic France: over 6,000 US seamen were impressed into the Royal Navy; shots had already been exchanged. War was declared by the USA on 19 June 1812 'to defend the freedom of the seas', although many Americans also saw the conflict as a means of expanding into British Canadian territory. A US attempt to invade Canada in late summer and autumn 1812 failed dismally when US militiamen maintained their constitutional right not to fight outside US territory. An expedition the following year achieved better results, leading to the capture of Detroit on 29 September 1813 and defeat inflicted on 800 British regulars and 1,000 Indians in the Battle of the Thames, 5 October. Jacob Brown invaded Canada with 3,500 troops on 2-3 July 1814, seized Fort Erie, and 3 days later engaged 1,700 British regulars under General Phineas Riall in the battle of Chippewa. The British were charged down, suffering 236 killed and 322 wounded; US casualties were 61 dead, 255 wounded. Brown continued to push northwards, until Sir Gordon Drummond arrived with reinforcements. The two sides met in the Battle of Lundy's Lane, 25 July, but neither could gain the advantage; Brown retired to Fort Erie, which was abandoned on 5 November, so ending all attempts to invade Canada. Meanwhile, on 31 August 1814 the British in their turn had invaded the USA with 14,000 troops newly arrived from Wellington's army in Europe; these advanced from Montreal under General Augustine Prevost. The target for the invasion was New York, but first Lake Champlain had to be secured. British vessels on the lake were decisively beaten in the Battle of Lake Champlain on 11 September (see naval operations, below); Prevost retreated. Farther south in Alabama the Creek Indians allied themselves with the British and rose in revolt. Militiamen under Andrew Jackson marched against them, defeating 900 warriors at Horseshoe Bend, 27 March 1814. Jackson, given command of the Gulf Coast area, moved to New Orleans following rumours of a British invasion. This took place on 13 December 1814, with 7,600 British veterans of the Peninsular War landing in the Lake Borgne area under the command of Major-General Sir Edward Pakenham. Jackson organized efficient defences at New Orleans, although he had only 3,100 trained troops. A full-scale British assault began on 8 January 1815. The British advanced in regular ranks, suicidal against well-positioned defenders, and over 2,000 were killed or wounded with Pakenham among the dead; only 7 Americans died. The British sailed a week later. Land operations in the War of 1812 therefore failed to bring decisive results. Meanwhile, naval operations had been continuing. America had only 14 seaworthy vessels; the Royal Navy employed over 100 ships, including 11 ships of the line and, despite brilliant single-ship actions, the US sailors were therefore unable to break the tight British blockade. The Americans achieved more decisive results on the inland waters, with Perry's victory over a Royal Naval squadron on Lake Erie, 10 September 1813, providing a turning-point of the war in the north-west. (See Perry.) The following summer, 1814, the British employed sea power in

combination with land forces for a damaging invasion in the Chesapeake Bay area. Admiral Sir John Cockburn's squadron joined 5,400 Peninsular War veterans, under Major-General Robert Ross, and on 19 August this force landed on the Patuxent for an advance on Washington. The British entered the US capital on the 24th, burnt the Capitol and the White House, and marched triumphantly back to their ships. The expedition then sailed north to land 16 miles from Baltimore but this time the local militia successfully defended the town, in an action on 14 September at Fort McHenry during which Ross was fatally wounded; the British withdrew on 14 October. Whilst the Americans were suffering these humiliations the British were dealt an equal disgrace in the most decisive action of the war, on Lake Champlain, 11 September. The British had constructed a squadron of 4 ships and 12 armed galleys to support Prevost's advance on New York. The Americans had a squadron of similar size at their Plattsburgh base, commanded by Lieutenant Thomas MacDonough. A ship-to-ship engagement took place on the 11th, during which the Americans outgunned their opponents; the British commander, Captain George Downie, was killed and his squadron surrendered after suffering heavy damage. War ended with the Treaty of Ghent, 14 December - signed before Jackson and Pakenham fought their Battle of New Orleans. The treaty made no mention of basic issues and decided nothing, although the British thereafter ceased violating US maritime neutrality.

Amiens, Battle of, August-September 1918 First World War (Map 10). Ludendorff's fifth and final offensive ended at the Marne in early August. On 8 August the allies began their counter-attacks, with the British 4th and French 1st Army under Rawlinson and Eugene Debeny pushing against the German 18th and 2nd under Hutier and Marwitz. Learning from the lesson of Cambrai, the allies avoided a preliminary artillery bombardment and bolstered the attack with 462 tanks. Fog cloaked the initial movement, and allied troops forced a salient 10 miles deep during the first 24 hours, helped by aircraft after the fog lifted. Ludendorff described 8 August as the 'Black Day'. Haig, British Commander-in-Chief, paused to regroup; the advance began again on 21 August but depletion of allied reserves eventually enabled the Germans to fall back to their ultimate positions. German casualties were over 100,000, allied about 44,000. The final storming of the Hindenburg Line would begin on 26 September after a preliminary US operation against the St Mihiel salient.

Anderson, Sir John, 1st Viscount Waverley, 1882-1958 British civil servant. Served in Colonial Office, 1905 onwards; Governor of Bengal, 1932-7; Lord Privy Seal, 1938-9 and Home Secretary, 1939-40 in Neville Chamberlain's government, with duties including those of Home Security; responsible for interning aliens and for air-raid protection - the Anderson shelter was named after him. This construction consisted of two curved walls of corrugated steel bolted to rails; the shelter was sunk 3 feet into the ground and covered with 18 inches of earth. Free issues were provided to those earning less than £250 p.a. On 12 June 1940 Anderson announced the completion of the shelter programme, which he had launched in late 1938; he claimed that 20 million people could now find shelter space simultaneously. Anderson shelters were later supplemented by the indoor Morrison variety. Sir John acted as Lord President of the Council, 1940-3, under Churchill; his Lord President's Committee, created June 1940, acquired major influence, dealing with all important domestic, Home Front and economic questions; Churchill called Anderson 'my automatic pilot'. Anderson acted as Chancellor of the Exchequer, 1943 to July 1945.

Angola, guerrilla war in, 1961-75 Fighting broke out in this Portuguese African colony in spring 1961, where tribesmen in the north were influenced by the advent of independence for fellow-Africans in neighbouring Congo. Portugal introduced emergency measures in April, sending 15,000 troops. The insurgents were organized into several political and semi-political groups, including the Union of Angolan People (UPA), the Movimento Popular de Libertacao de

Angola (MPLA) and the Front for the Unity of Angola (FUA). The guerrillas were helped by the establishment of bases in the Congo. The death of Antonio de Oliveira Salazar in 1970 - Portuguese dictator for 36 years - resulted in the assumption of power by President Caetano, ousted in spring 1974 by General Spínola, a previous commander in Portuguese Africa and a critic of Portuguese policies: during his brief regime Spínola began the proceedings for early independence in the colonies, thus ending the need for insurgency in Angola, Portuguese Guinea - where lower-scale conflict had begun in 1963 - and in Mozambique. Portuguese troop strength before withdrawals began in 1974 had risen to about 55,000 men. Opposition to the Angola war from inside Portugal had been steadily increasing, on the grounds of the unpopular overseas service and through the high cost: in 1974 Portugal's expenditure on defence amounted to 6.8 per cent of the Gross National Product, at \$880 million, and thus represented a higher percentage of the GNP than any other NATO country - the figure for Britain and the USA respectively was 5.2 and 6.0. The new Portuguese government agreed in 1974 for independence for both Angola and Mozambique. Targeted independence dates were respectively 25 June and 11 November 1975. But fighting again broke out in 1975 between rival nationalist groups in Angola, with these factions becoming concentrated around three principal organizations: the National Front for the Liberation of Angola, FNLA, the National Union for the Total Independence of Angola, UNITA, and the MPLA. At the end of the year FNLA forces controlled much of the northern part of the country and UNITA troops held the south; the MPLA managed to cling to a central sector including the capital of Luanda. The situation changed dramatically in the first weeks of 1976 with communist support for the MPLA arriving at Luanda in the form of Cuban troops and Soviet military equipment. The latter included T-34 tanks; multiple rocket launchers and transport vehicles; MiG 19 aircraft were flown into Luanda airfield, and a Soviet task force including a tank-landing vessel cruised off-shore. Cuban troops, eventually numbering up to 8,000, pushed north and south from the central region and both FNLA and UNITA proved incapable of stemming the advance, despite the presence of about 1,200 South African troops in the far south region. Despite pressure from Secretary of State Kissinger, the US Congress blocked the dispatch of aid. By early February the major FNLA and UNITA bases at Carmona and Novo Redondo had been seized, and the MPLA were in control of the country by early March; fears immediately arose that the Cuban troops might move beyond Angola into Zambia or into white Africa. Anti-aircraft No specific attempts were made to provide protection against air attack in the First World War apart from the use of machine-gun fire and crude balloons, and theorists in the inter-war years such as Douhet and Mitchell gave the impression that aircraft in future conflicts would be comparatively safe from ground reprisal. On the basis of misleading figures from bombing in 1917-18 it was estimated in the 1930s that each ton of HE dropped in the next war would cause 50 casualties; perhaps as many as 600,000 people would perish in the first major bombing attack on London. This erroneous concept of the impossibility of finding adequate defence against the bomber stilted development of anti-aircraft weapons. Apart from using other aircraft, defence against air attack took two main forms up to and during the Second World War - balloon and anti-aircraft artillery. Balloon aprons had in fact been constructed for the defence of London during the First World War, but with minimal value. After 1918 some experiments took place in Britain to produce a balloon with cables suitably strong to destroy any aircraft colliding with them, but by 1936 the British Air Staff had come to the conclusion that no immediate prospect existed of perfecting a balloon capable of taking such a cable to the 15,000-foot level: this height was considered to be the minimum required to provide defence against high-flying bombers. Balloons were therefore produced for lower altitudes, of

about 5,000 feet, to protect against low-level attacks: by 1940 about 1,500 balloons were deployed in Britain, mainly of this type and organized into 52 squadrons, with future production aimed at 1,200 a month. Such a defensive system was urgently required in view of the acute shortages of anti-aircraft artillery. Until a short while before the start of the Second World War, British artillery defence against low-level attack mainly comprised 3-inch guns and the conventional Lewis machine-gun; even by 1940 Britain had only 1,204 heavy and 581 light anti-aircraft guns in the entire country, compared with an estimated required establishment of 2,232 and 1,860 respectively. Britain had, however, an important advantage in her radar: information was collected from about 20 main radar stations on the coast and passed from these points and from observers to the Group Operations Room, Fighter Command. In the early stages of the Blitz about 200 AA batteries were located in the London area: the number of guns eventually rose above 2,000. The Blitz also revealed that pre-war estimates of the effectiveness of bombers were grossly pessimistic. During the war both strength and weapon power in anti-aircraft systems improved for all major participants. Britain's armoury included the famous 40 mm Bofors, firing 2-pound shells at 120 rpm to a maximum altitude of 12,000 feet; the Oerlikon 20 mm used on shipping, with drum magazines of 60 rounds firing at 650 rpm; and the 3.7-inch gun for high-level defence. The latter weapon was similar to the German 88 mm, which fired 8 rpm to a maximum altitude of over 35,000 feet. US forces adopted the Oerlikon. Later developments concentrated on more effective co-ordination between radar and artillery, as with the 1945 SCR-854 antiaircraft series, and on the development of surface-to-air missiles (SAM). The latter have been produced in both strategic and tactical forms. Strategic antiaircraft missile systems are designed primarily against opposing missiles, but can be used against aircraft. They include the US Nike Hercules, first becoming operational in 1958, which has nuclear or HE warheads, a range of over 140 km and a ceiling of over 45 km, and the Soviet Griffon, first displayed in public in 1973 and believed to have a range of about 250 km with a ceiling of about 30 km. Tactical SAMs include the US Hawk ('Homing All the Way Killer') which can search out and destroy aircraft travelling at supersonic speeds as low as 30 metres and as high as 11,000 metres; the British Bloodhound and Thunderbird; and numerous Soviet SAM weapons code-named by NATO as Ganef, Goa, Guild and Guideline. The latter has been extensively exported, including to Egypt where it has become a major factor in the Arab-Israeli balance: this has a ceiling of 18,000 metres and a range of about 50 km. Latest post-war advances were incorporated into the NATO Air Defence Ground Environment System, NADGE, a multi-national programme begun in 1967. The system was designed for air defence against aircraft flying at heights up to 100,000 feet, but there was no provision for anti-ballistic missile (ABM) defence. Up to 85 sites are envisaged in the NADGE plan, stretching along the NATO front: each is planned to use latest computer and data display equipment to undertake functions of detection, tracking, height-finding, target identification and target-size analysis.

**Anti-Ballistic Missile (ABM) defence** In the 1960s both the USA and the Soviet Union declared an interest in ABM systems as a means of defence should deterrence fail, and as a possible method of achieving a lead in the arms race. ABM defence generally covers two types of systems: area and terminal defence. The first refers to the interception of missiles above the atmosphere; the latter refers to the interception of any approaching missile which may have pierced the first defences. Thus the Russian Galosh missile is believed to be intended for area defence, while terminal defence could be provided by either Griffon or the Guideline medium-range antiaircraft missile. The USA announced plans to build a limited ABM system in 1967, initially to protect the country against Chinese attack. ABM missiles in this Sentinel system would be the Nike Zeus, developed after 1956 as a long-range anti-aircraft missile, and the



short-range Sprint for the terminal defence. The Sentinel system was changed in 1969 to the Safeguard system, which had the more limited aim of covering Minuteman ICBM missile sites and small numbers of population centres. Safeguard uses the Spartan missile for area defence - an enlarged version of the earlier Nike Zeus - and the Sprint for terminal defence. The USA also began to research the Site-Defense (originally Hard Site) ABM system for more economical protection of ICBM sites: this would only use short-range missiles. The Interim Strategic Arms Limitation Talks (SALT), signed in May 1972 between the USA and the Soviet Union, set restrictions on ABM development. America was allowed to build one Safeguard site; this is now operational at Grand Forks. The Soviet Union continued to develop a more effective ABM missile to replace the Galosh in the Moscow area defence network.

Antietam Creek, campaign and Battle of, September 1862 American Civil War (Map 3). Also known as Sharpsburg. Following the Confederate success at Bull Run, Lee led 55,000 troops over the Potomac at Leesburg on 4 September 1862 to begin his first invasion of the north. Lee's movement was screened by cavalry under Stuart. The southern commander aimed to advance north-west into Pennsylvania using protection offered by the Catoctin Mountains; on 9 September he issued orders for Longstreet's 1st Corps to march towards Hagerstown, forming the most northern wing of the Confederate advance; Jackson, on the southern wing, would cross the Potomac to seize Harper's Ferry. To face this advance McClellan had already moved from Washington with the Army of the Potomac, totalling 97,000 men. On 12 September a copy of Lee's 9 September order fell into McClellan's hands, revealing that the southern army was spread over 25 miles and split by the unfordable Potomac. But the Union Army moved too slowly and McClellan missed his opportunity to strike. Lee concentrated at Sharpsburg while covering forces delayed the Union advance in the so-called Battle of South Mountain. Jackson took Harper's Ferry after sharp fighting on 14-15 September, then rushed to join Lee at Sharpsburg. McClellan still hesitated, delaying his attack until 16 September by which time the Confederates totalled 45,000 men in excellent defensive lines along Antietam Creek near Sharpsburg. Battle began on 17 September - to be the bloodiest one-day clash in the American Civil War. McClellan planned to pin down the Confederate right (southern) wing, while a three-corps attack hammered Lee's left and two more corps struck the Confederate centre over Antietam Creek. Jackson's regiments offered stubborn defence against the Union thrust in the north, especially around the sunken road known thereafter as 'Bloody Lane'. By noon the Union attack against this Confederate left wing had been halted. In the centre, Union troops under General Ambrose Burnside managed to seize a bridge over Antietam Creek after desperate resistance by Longstreet's corps. It then took Burnside two hours to concentrate his troops for the assault through the Confederate centre, and McClellan hesitated to support Burnside with 20,000 Union troops held in reserve. The Confederates in the centre were starting to give way under Burnside's pressure when more Confederate units rushed to the battlefield: these, under General A. P. Hill, had been left at Harper's Ferry. This division struck Burnside's left flank, driving the Union troops back across the creek and ending the battle. Lee withdrew unmolested across the Potomac. Tactically, he could claim victory, although strategically his invasion of the north had been blocked. McClellan continued to hesitate: he failed to follow Lee until ordered to do so by President Lincoln on 5 October, so beginning the Fredericksburg campaign. Union losses at Antietam were about 12,500, Confederate about 13,700.

Anti-tank weapons First attempts to defend against tanks were made in the First World War by deploying normal field artillery with lowered trajectories: thus the Hindenburg Line contained isolated anti-tank positions with dug-in field-guns. Between the World Wars special guns of light construction were produced by all major powers: these were designed with a low

silhouette and were given sufficient power to penetrate the armour of every known tank. But the race between armour and power to penetrate armour had already begun, and this accelerated soon after hostilities opened in 1939. Initially the allies seemed to have the advantage. During the Battle of France the Germans discovered that their existing 37 mm anti-tank guns were unable to punch through the thick armour of opposing tanks. Moreover, in the campaign against Russia, the Germans found that the 76 mm guns on the Soviet KV1 and T34 tanks could penetrate the 30 mm armour on the German vehicles, and an urgent programme was therefore begun both to improve German anti-tank guns and to strengthen panzer armour. The standard size of the gun was raised to a 75 mm minimum; production of the famous 88 mm gun had strong impact - this artillery piece was initially designed as an anti-aircraft gun but Rommel showed how effective it could be in an anti-tank role. The British 25-pounder gun/howitzer had similar calibre to the German 88 mm, and the same tendency was shown to increase penetration power: the 25-pounder was developed to replace the old 18-pounder prior to the war; the British 2-pounder was replaced by the 6-pounder in 1940, and the latter was later itself overtaken by the powerful 17-pounder which had a 3,000-yard range. A Russian light anti-tank gun was the Type 32 45 mm with a range of almost 10,000 yards; a comparative US gun was the 37 mm, with a maximum range of 12,800 yards. Japan largely neglected both tank and antitank warfare. The Russian and US armies were also equipped with special tank destroyers and self-propelled guns for anti-tank warfare. The most effective Soviet destroyer was the SU-122 built on the T34 hull, carrying a 122 mm gun and with a speed of up to 34 mph: this weapon had a range of 375 miles. The US M10 gun motor carriage was a lighter-weight tank-killer, with a 3-inch gun mounted on a Sherman hull firing armour-piercing shells: these could penetrate 100 mm armour at 100 yards. The Germans embarked on maximum effort to produce a variety of mobile anti-tank weapons, especially after encountering the deadly Soviet T34 tank in 1941: numerous models were produced, including the Hertzler weighing 16 tons and armed with a 75 mm gun. Among Second World War infantry anti-tank weapons was the famous 'Bazooka', a 2.36-inch hand-held rocket launcher developed by the US Ordnance in 1942. The British began the war with the Boys Anti-Tank rifle, in fact already obsolete, which was deployed at platoon level. This was replaced by the Projector Infantry Anti-Tank (PIAT), with an extremely short range: this weapon weighed only 34.5 pounds and its bomb 2.5 pounds - the user had to approach within 100 yards of the target before a 'kill' could be obtained. Towards the close of hostilities the Germans produced the 'panzer-faust' as a one-man anti-tank rocket; this also had only a short range. The rocket became increasingly important as an anti-tank weapon in post-war years, especially those rockets which could be guided manually on to the target. This method was first suggested by the Germans, but was developed after 1945 by the French: the system enabled the operator to pass signals down a thin wire paid out behind the missile in flight. The first such weapon to enter service was the French SS 10 with a range of 1,600 metres; work on the SS 10 began in 1946 and the weapon became operational 10 years later; the SS 11 was introduced as a slightly larger version, with a weight of 65 pounds and able to travel over 2,500 metres to penetrate 600 mm of vertical armour plate. Other modern guided anti-tank missiles include the man-portable French ACL-STRIM, with a calibre of 88.9 mm and an effective range of 400 metres; the German Cobra, also man-portable but with a longer range; the Swedish short-range Bantam, manufactured by Bofors; the British Swingfire which went into service in 1969 and which has a maximum range of over 3,000 metres; and the British man-portable Vigilant. All these and other guided missiles enable accuracies of up to 90 per cent in tests, but this percentage drops substantially in exercise conditions and would presumably be even lower in actual combat. 'Anvil' operation,

August 1944 Second World War (Maps 13, 14). Code-named 'Dragoon' in the final phase, this plan for an allied invasion of southern France was the subject of intense Anglo-US debate, with the British anxious to avoid reduction of allied strength in the Italian campaign. The US Joint Chiefs of Staff, supported by Eisenhower, insisted upon the plan as a means of drawing away German forces facing the Normandy landings. The operation began on 15 August, undertaken by the US 7th Army under Lieutenant-General Alexander Patch. The assault, between Hyères and Cannes, proved successful: by nightfall nearly 100,000 men were ashore and the meagre German defences - two infantry battalions - had been swamped; the French 2nd Corps under General Jean Lattre de Tassigny landed in the second wave. General Frederick Wiese's German 19th Army retreated up the Rhone valley. The allies encountered more determined opposition at Monté-limar, 23-28 August, and the bulk of the German forces escaped. The French component captured Toulon and Marseilles, 28 August. Contact between 'Dragoon' forces and Patton's 3rd Army coming down from Normandy was made west of Dijon, 11 September; 4 days later the southern invasion group became the US 6th Army Group under Lieutenant-General Jacob M. Devers, which included the newly created 1st French Army commanded by Lattre de Tassigny.

Anzio Operation, 1944 Second World War (Map 14); campaign in Italy. The amphibious operation at Anzio, code-named 'Shingle', was designed to speed allied progress by leapfrogging the enemy lines; the movement was to be in conjunction with a thrust by the allied 5th Army south of Cassino. Continued deadlock at Cassino resulted in a change of emphasis for the Anzio operation: the latter was strengthened as a full-scale offensive. The landing took place early on 22 January, involving 50,000 British and US troops under US Major-General J. P. Lucas with the spearhead provided by the 1st British and 3rd US Divisions. A bridgehead was secured on the coast 35 miles south of Rome and 60 miles behind the German lines at Cassino. General Lucas now preferred to consolidate his position, believing the mere presence of the Anzio force would draw off the Germans from Cassino. But German reserves were rushed from Rome and north Italy: by the close of January the 312 allied divisions in the Anzio bridgehead were opposed by 5 German divisions; the enemy counterattacked on 3 February; by nightfall on the 17th a deep wedge had been driven into the allied lines. The defenders retaliated with sea and air bombardment, and the Germans began to fall back during the night of the 18th. Between 15 and 20 February the Anzio forces, named the 6th Corps, suffered 3,400 casualties, and a high rate continued. Command was now given to Lieutenant-General L. K. Truscott, who repulsed the next major German thrust on 28-29 February. The bridgehead remained invested throughout March and April. Finally, on 23 May after Cassino had fallen to the allies, the reinforced 6th Corps broke out and joined with 5th Army units on the 25th. Allied battle casualties at Anzio totalled over 25,000, including 7,000 dead. Kesselring later claimed total German casualties to have been 40,000, of which 5,000 were killed. Churchill commented on the operation: 'We had hoped to land a wild cat that would tear out the bowels of the Boche. Instead we have stranded a vast whale with its tail flopping about in the water.'

Appomattox, campaign and Battle of, 1865 American Civil War (Map 3). The year 1865 opened with the Union armies poised to reap the results of Grant's twin turning movements: Meade's advance into the Wilderness of North Virginia, and Sherman's advance to Atlanta and to the sea. The jaws of the pincer began to close. Jefferson Davis attempted to improve the increasingly hopeless Confederate situation on 3 February by appointing Lee to supreme command: Joseph Johnston would command the scattered Confederate forces in the Carolinas. Sherman reached Columbia in South Carolina on 17 February and continued north, turning from the coast on 15 March towards Dentonville with 60,000 men. Johnston had only 27,000 men with which to oppose him, but attacked on 19 March, hoping to destroy the Union

left wing before Sherman could concentrate against him; the Union left was severely mauled but retained cohesion. Johnston withdrew on 20 March having lost about 3,000 men; Union casualties were about half this number. Sherman advanced to Goldsboro on 23 March; he rested for 3 weeks before starting out to join Grant near Petersburg. Meanwhile, General J. Wilson's Union cavalry corps of 13,500 men stabbed into Alabama on 18 March and attacked the Confederate supply base at Selma on 2 August, taking the town; Wilson continued into Georgia. Grant maintained the threat around Petersburg with 90,000 men from the Armies of the Potomac and the James; Lee opposed him with only 60,000, many exhausted and ill-equipped. Lee nevertheless threw forces forward at Fort Stedman on 25 March, but the battle merely weakened him still further, and next day Grant received 30,000 reinforcements with the arrival of Sheridan's corps. A Union attempt to encircle Lee's flank on 29 March was blocked by Lee's brilliant manoeuvring at Dinwiddie Courthouse and White Oak Road, but an assault by Sheridan's troops at Five Forks on 1 April exposed the entire right of the Confederate Army. Grant launched a full-scale assault on Petersburg on 2 April and by nightfall the Confederates were withdrawing. Lee hoped to be able to join Johnston south of Danville. The Confederate move south-west began on 3 April; a running campaign continued for the next 6 days. A Confederate delaying action at Saylor's Creek was smashed on 6-7 April, reducing Lee's strength to under 30,000 men. Sheridan outmanoeuvred Lee by reaching Appomattox on 8 April as the Confederates neared Appomattox Courthouse, 2 miles to the northeast. The so-called Battle of Appomattox took place on 9 April: the Confederates attacked Union cavalry, but the position was entirely hopeless with massed Union infantry deploying for battle in overwhelming strength. Lee sought a ceasefire and met Grant at Appomattox Courthouse. The southern commander surrendered his army at 3.45 p.m., 9 April. In the south Johnston surrendered to Sherman on 26 April; all Confederate troops had laid down their arms by 26 May and President Andrew Johnson - Lincoln's successor after the latter's assassination on 14 April - issued his proclamation of amnesty on 29 May.

Arctic convoys, 1941-5 Second World War (Map 15). Hitler's invasion of Russia, June 1941, soon led to appeals for help from Stalin, promptly answered by Churchill. Destination ports were Murmansk and Archangel, threatened by U-boats and by aircraft and surface ships based in ports won by the enemy during the Norway campaign, 1940. The first convoy sailed from Iceland on 21 August 1941. By the end of 1941 8 convoys had sailed to Russia and 4 had returned; only 1 vessel had been lost, sunk by a U-boat. But in January 1942 Germany transferred the battleship 'Tirpitz' to the Norwegian port of Trondheim. The existence of this ship in northern waters, together with similar threats offered by other surface raiders such as 'Hipper', 'Scharnhorst' and 'Gneisenau', severely complicated sailings: ships in a concentrated convoy were highly vulnerable to attack from surface vessels, yet if the convoy scattered the vessels became easy targets for U-boats. This dilemma resulted in the tragedy of Convoy PQ17, July 1942. Air reconnaissance revealed the disappearance of the 'Tirpitz' and 'Hipper' from Trondheim; the Admiralty, believing these massive warships might soon intercept PQ17, ordered the convoy to scatter on 5 July. The destroyer escort left the merchantmen in order to block the approach of the German surface vessels. The 'Tirpitz' and 'Hipper' were in fact returning to Norway. German U-boats and aircraft struck the scattered merchantmen: of 36 vessels which started the voyage, 2 had turned back, 13 and 1 rescue ship were sunk by aircraft and 10 by U-boats. By the end of 1942 24 ships had been sunk by U-boats during the year and 36 by aircraft, from a total of 13 convoys to and from Russia. Only the destruction of the German surface ships gave real protection, although ironically these warships caused no direct casualties. 'Gneisenau' was severely damaged February 1942, 'Hipper' was sunk in December 1942, 'Scharnhorst' in December 1943 and

'Tirpitz' in November 1944. Only 4 ships were lost in 1943, all by U-boat - but only 6 convoys sailed; 9 convoys sailed in 1944 with a loss of 7 ships, by U-boats; 4 convoys sailed in 1945 for a loss of 5 ships to U-boats and 1 to aircraft.

Ardennes, German offensive in, December 1944  
Second World War (Maps 12, 13). Known as the 'Battle of the Bulge'. Hitler apparently sought a modern version of the March 1918 offensive by Ludendorff in the Somme region. Ludendorff had thrown 40 divisions against 21 British; Hitler assembled 30 which would strike against only 4 American. But Hitler had virtually no reserves. The Führer chose the Ardennes as the battle area, the same difficult terrain which had brought such success in the battle for France in May 1940, and he had a similar battle plan - to thrust for Antwerp, thus cornering allied forces north of the Antwerp-Brussels -Bastogne line. The attack began early on 16 December. Rain and fog had reduced allied reconnaissance for the past 36 hours and panzer units now jabbed through the mists: only 4 days before, Eisenhower had described these units as 'weak' and 'badly trained'. Neither Eisenhower nor Bradley, Commander of the 12th Army Group, seemed to appreciate the extent of the German offensive. Realization came to Eisenhower late on the 17th, but by then the panzers were pushing towards Stavelot, where the allies held large supply stocks, and farther south had prized a gap in the allied lines between St Vith and Bastogne. The US 1st Army, commanded by General Courtney Hodge, was forced back on a 50-mile front, but farther north the US 5th Corps, under General Leonard Gerow, stood firm near Malmédy and halted the advance on Liège. By 19 December the allies had begun to recover. To the south the US 4th Infantry and 9th Armoured Divisions stopped the Germans near Echternach in Luxembourg, and the US 101st Airborne Division bolstered Bastogne, which was almost surrounded. On 18 December Bradley had ordered General Patton to halt his 3rd Army advance on the Saar and to undertake a 90 degree northern shift in direction to hit the enemy's southern flank. The German advance south of St Vith had, however, split the US 1st and 9th Armies north of the bulge from Bradley's 12th Army Group HQ; to clarify communications Eisenhower decided on 20 December to pass command of the two US armies in the north to Montgomery, Commander of the 21st Army; this only left Patton's force under Bradley. On Boxing Day Patton's 3rd Army reached Bastogne. Battle raged around this town until 2 January, but better weather in the last days of December enabled about 5,000 allied aircraft to inflict heavy damage. The allied counter-offensive began on 3 January, with Montgomery ordering Hodges's 1st US Army down from the north and with Patton maintaining his pressure from the south. By 16 January the bulge had been eliminated. About 120,000 German casualties were suffered, 600 tanks and guns destroyed, 1,600 aircraft and 7,000 vehicles; allied casualties were 40,000 men and about 730 tanks. The allied invasion of Germany, delayed about 6 weeks, could now begin.

Armstrong, William George, Baron Armstrong of Cragside, 1810-1900 British inventor. A Newcastle solicitor turned hydraulic engineer, Armstrong invented a hydro-electric machine in the early 1840s and a hydraulic crane in 1846. In July 1855, after merely 9 months' design work, he produced a steel-tubed built-up rifled breech-loading gun, employing all contemporary resources of metallurgy and technology: the 8-pounder displayed far better accuracy than the existing smooth-bores in the British Army - according to a contemporary study 'the accuracy of the Armstrong gun at 7,000 yards was as seven to one compared with the common gun at 3,000 yards.' But the British Army refused to adopt the gun on a wide scale and retained existing smooth-bore muzzle-loaders for a further 14 years. Armstrong, working from his Elswick Ordnance Company, sold to other nations. He produced a breech-loading gun with a wire-wound cylinder in 1880. The Elswick Engineering Works merged in 1927 with Vickers' Sons and Co. to form Vickers Armstrong.

Arnhem operation, September 1944  
Second World War (Maps 12, 13).

Montgomery, Commander of the 21st Army Group, proposed to Eisenhower in early September that the allied advance should be hastened by an airborne offensive against Arnhem, Holland. German defences blocked the northern advance over the Meuse and Rhine, and also hindered a thrust towards Rotterdam, Antwerp and the V-bomber sites. Eisenhower agreed to the scheme, code-named 'Market Garden'. The plan envisaged an advance by ground forces towards Arnhem, in conjunction with airborne attacks on bridges over the Maas, Waal and Rhine at Grave, Nijmegen and Arnhem itself. The air drops were carried out during daylight on 17 September, intended to provide stepping-stones over the rivers for the advancing British 2nd Army led by the 30th Corps. Troops of the 1st British Airborne Division, supported by a Polish brigade, dropped on the north bank of the Rhine to move forward and seize Arnhem bridge; airborne units of the US 82nd Division parachuted down to capture the bridges at Nijmegen and Grave, while the US 101st Airborne aimed to secure the road from Grave to Eindhoven. Aircraft shortages meant the drop had to be spread over three days, allowing the Germans to recover. The two US airborne divisions achieved their objective to the north of Eindhoven and at Grave and Nijmegen, but the British element spearheading the attack at Arnhem were dropped 7 miles from the Rhine bridge. Bad weather hampered the fly-in of reinforcements and supplies. The British 1st Airborne troops were left isolated; gallant fighting continued until 25 September, but Montgomery was then obliged to order the survivors to pull back. This attempt was made during the night of 25-26 September, with only 2,400 men escaping out of the original 10,000.

Arnold, Henry Harley, 1886-1950 US General of the Air Force. Graduated West Point, 1907; joined Army Aviation, 1911; appointed Chief of US Army Air Corps, 1938; Chief of US Army Air Forces, June 1941, remaining in this position throughout the Second World War, and a member of the US Joint Chiefs of Staff. Arnold proved more flexible than his superior, Marshall, in the acute Anglo-US debate over the Second Front in Europe, but he criticized the lack of effective use of bombers being sent to Britain in late 1943, urging greater intensification of the strategic bombing campaign; General of the Air Force, May 1949.

Arras, Battles of, April 1917, June 1940 First and Second World Wars (Maps 10, 13). Nivelle aimed to batter through the German lines in the Aisne region. But essential to the Nivelle offensive was a diversionary attack by the British in the Arras region. The new British Prime Minister, Lloyd George, arranged to place the BEF commander, Haig, under Nivelle's orders; Haig reacted with horror, as did the new British Chief of the Imperial General Staff, Robertson. Arrangements were eventually made whereby Haig retained absolute command of the British Army and had the right to appeal against the French orders, although he would follow these for the coming offensive. On 9 April the British diversionary attack was launched 8 miles south of Arras to 7 miles north of the town after a heavy preliminary artillery and gas bombardment. The British offensive comprised General Allenby's 3rd Army on the right and General Sir Henry Sinclair Home's 1st Army on the left. Included in the British attack were a number of tanks. British-Canadian forces totalled 14 divisions; German strength comprised 6 divisions in the front line and 6 in close reserve, commanded by General Baron Ludwig von Falkenhausen. The initial attack was successful, although the tanks either broke down or were destroyed through being committed piecemeal. To the north the British pushed forward 3 miles, with the attack commanded by General Sir Charles Fergusson - the deepest penetration since trench warfare solidified after the Race to the Sea in autumn 1914. Canadian troops stormed and took the greater part of the famous feature known as Vimy Ridge. Farther south the supporting British 5th Army under General Hubert Gough made little progress. The battle had a final spasm on 3 May, when Haig sought to lend support to the Nivelle offensive which had now begun. British casualties at Arras were about 84,000; the German total was probably

about 75,000. Arras became the scene of critical fighting in May 1940, and a comparison underlines the revolution brought about by blitzkrieg. The Second World War engagement came after the German drive on the Channel wheeled northwards in the battle for France. French and British units were sent reeling backwards by the swift-moving German panzers and motorized infantry; a task force sent by Gort, BEF commander, attempted to counter-attack German armour at Arras, but was beaten off by Rommel's 7th Panzer Division on 21 May. During Rommel's subsequent strike for the coast he moved his division 150 miles in one day; his casualties amounted to 3,000 men - as compared with the British losses of 80,000 in 1918 merely to gain a handful of miles.

Artillery, general Artillery in the Napoleonic Wars was divided into light and heavy, defined by the weight of solid shot fired. Light guns, deployed at battalion level, were usually 4-6 pounders. Heavy guns, 8-12 pounders, were grouped in batteries: the latter were termed redoubts if they enjoyed all-round breastwork protection, or 'fleches' or redans if the positions were open at the rear. A distinction had already emerged between conventional field-guns with a low to medium angle of fire - trajectory - and the high-angle howitzers and mortars which lobbed the missile. A further distinction would later become apparent between the mortar as an infantry weapon and the howitzer as an artillery piece. In the Napoleonic era guns fired roundshot, with a maximum range of up to a mile including the bounce and roll of the missile, or grapeshot for bombardments of up to about 400 yards; shells had a varying range, but so far only the British had developed shrapnel. Guns were limited in close support use through slow rate of fire, inaccuracy and recoil problems - valuable time had to be spent realigning after the gun jerked back with each discharge. Efforts had however been made, especially by Gribeauval, to improve mobility through reducing the length and weight of the barrel and gun carriage. Napoleon, who declared 'it is only with artillery that one makes war', used this weapon en masse to punch a hole through the enemy lines, as at Wagram in 1808; Wellington employed his artillery in a more selective fashion, aiming at specific targets.

Post-Napoleonic developments centres on the adoption of rifling, the change to breech-loading, improvements in ballistics, and the introduction of better recoil mechanisms. During the Crimean War a number of muzzle-loading smooth-bore guns were converted into rifled weapons, giving greater range and accuracy; the first successful breech-loading cannon had in fact appeared in 1851 with the Krupp 6-pounder, rapidly followed by a version made by Armstrong and Whitworth in Britain. By the 1860s almost every principal embodied in the modern gun had been introduced, although often in crude form - considerable difficulties arose in 1866 through burst barrels on the Krupp guns. At the start of the Franco-Prussian War the French Army was completely equipped with rifled cannon, although many were still muzzle-loaders and manufactured from bronze - this material had been chosen since it resulted in fewer flaws during manufacture, thus reducing chances of burst barrels. The Prussians, on the other hand, were armed with the Krupp gun made from steel, with Krupp having recently introduced radical improvements in the casting process. This gun, being a breech-loader, proved far superior to the French weapon, and the Prussians added to this advantage through their better artillery employment. Detailed study of the tactical use of artillery had been made in Prussia and this weapon was utilized in devastating form especially by the Guards artillery commander Prince Kraft zu Hohenlohe. Artillery was massed in highly effective fashion, notably at Sedan. Development in the late nineteenth century in Germany, Austria, France, Britain and the USA led to heavy guns with ranges of up to 15,000 yards and field-guns with ranges of up to 9,000. Rates of fire were vastly improved through the absorption of recoil, with Krupp again leading the way: a Krupp hydraulic system soaked up recoil. The system was adapted in the French 75 mm and the 1897 model of this gun was the most famous French

artillery piece of the First World War: it had a rate of fire of 6 rounds per minute and threw a 16-pound shell over 7,500 yards. The main German guns included the 42 cm which could fire a 1-ton shell 16,000 yards, the 75 mm Model 1906 firing a 15-pound shrapnel shell or a combined HE and shrapnel missile; the Germans had also developed a better variety of howitzers. On average each German army corps had about 160 guns of all types; the French total was 126 and the British 154. The heaviest gun was the German Big Bertha, 75 tons, which had a crew of 280 and a rate of fire at 10 rounds per hour: this weapon was used against the forts of Liège, Maubeuge and Antwerp. Massed artillery bombardments initially allowed the infantry to sweep forward and occupy the enemy front trenches; this advantage was removed after the first months of war, when trenches were extended in area. The next step was the rolling barrage, moving steadily forward ahead of the infantry to allow the latter to advance deeper; this tactical move was introduced at the Somme, 1916, preceded by a general bombardment in which 1,738,000 shells were blasted into the German defences. But the rolling barrage still failed to achieve the breakthrough. Messines, 1917, was preceded by a 17-day bombardment of 312 million shells; the Third Battle of Ypres, soon after, began with a 19-day bombardment using 4,300,000 shells - 321 trainloads amounting to a year's production for 55,000 war workers. The barrage and the downpours of rain turned the area into a wilderness of waterlogged shell craters, hampering the movement of advancing troops. Ypres marked the last great artillery battle of the Western Front. Inter-war development was mainly concerned with achieving greater mobility for artillery weapons and with the production of specific types for definite functions. Self-propelled guns were advanced, together with specially designed tracked vehicles for towing. Warhead improvements included the introduction of shaped Armour Piercing (AP) shot, demonstrated by the Swiss in 1938: this 'shaped charge', consisting of explosive and shot, had better capabilities for cutting through armour. Other developments followed, including the British projectile known as the Armour Piercing Discarding Sabot (APDS), used in the latter stages of the Second World War. To aid mobility and to make weapons air-portable for airborne operations, guns were reduced in weight: the US 75 mm pack howitzer, for example, weighed only 1,340 pounds, compared with 1.5 tons for the 75 mm gun, and could be easily dismantled. Guns were further diversified, with anti-tank and anti-aircraft categories becoming increasingly important. The most famous German gun in the Second World War was the 88 mm, designed as an anti-aircraft weapon but used - especially by Rommel - as a highly effective anti-tank field-gun with a range of about 12,000 yards. Other German guns included the monstrous Karl siege weapon which fired a shell weighing 4,850 pounds - this had a crew of 250 men and could only fire twice an hour. The main British artillery piece was the 25-pounder which replaced the old 18-pounder, able to be used as a howitzer, long-distance or anti-tank gun. US guns included the 37 mm anti-tank weapon. The Russians were probably the most effective artillery users: weapons included the 122 mm howitzer, range 22,000 yards; the Red Army also utilized rockets. Russian artillery tactics primarily depended upon mass barrages, but the Red Army, in common with all other forces, developed close co-ordination between artillery and tanks. Improved wireless communication enabled better central direction of heavy artillery groups: this technique was first developed by US General Charles Summerall in the closing months of the First World War: a single Fire Direction Centre rapidly and accurately shifted the barrages from a number of batteries across a wide front, thus increasing fire power effectiveness. In Montgomery's 8th Army a senior artillery commander was appointed at every level of infantry or armoured formation command, responsible for the co-ordination of the fire from that formation with adjacent groups. Post-war developments have increased this co-operation, especially through



computers. Thus the British FACE system - Field Artillery Computer Equipment - processes all information required to place a shell accurately on target within a few seconds; information includes earth rotational effects, muzzle velocity of each gun for each charge, temperature of the ammunition charges and even meteorological data. The system, introduced into the British Army in 1969, is for use with the latest 105 mm, 155 mm and 175 mm guns: these are all multi-charge weapons, having both high and low angle fire capability, and each employs many projectile types. Modern US guns range from the 8-inch self-propelled howitzer M-110, introduced in 1962 with a maximum range of 16,800 and with nuclear capacity, to the 105 mm towed howitzer which for many years has been the standard general purpose close support light artillery weapon of the US Army. The largest conventional gun in service with the Soviet Army is the 203 mm howitzer, with the same calibre as the US 8-inch. The Red Army has continued the doctrine of employing artillery fire 'en masse', and the proportion of artillerymen remains at about 25 per cent of the army as a whole - higher than in Western forces.

Atlanta, campaign and Battle of, 1864 American Civil War (Map 3). Sherman opened the Atlanta campaign on 5 May 1864. The aim was to disrupt the Confederacy while Grant launched the second half of a gigantic pincer movement in the Virginian Wilderness. Sherman's forces comprised the Army of the Cumberland, 61,000 men, under Thomas; the Army of the Tennessee, 24,500 men under General James McPherson; and the Army of the Ohio, 13,500 troops under General John M. Schofield. Against this Union array was General Joseph Johnston's Army of the Tennessee, supported by cavalry under John H. Morgan and Forrest. Johnston selected a series of defensive positions - at Dalton on 9 May, Resaca on 15 May, Allatoona on 24 May - which he held until the last moment before slipping to the next. Sherman declined to attack in frontal fashion; instead he attempted to outflank the enemy, vainly inviting Johnston to attack. Only once did Sherman throw his Union troops forward in frontal assault, at the Battle of Kenesaw Mountain, 27 June; he lost about 3,000 men to Johnston's 800 with no appreciable gains. Johnston withdrew to positions north of the Chattahoochie River, 25 miles north-east of Atlanta, which Sherman attempted to turn on 9 July; the Confederates pulled back to Peachtree Creek, immediately to the north of Atlanta. Johnston retired on 17 July and was succeeded by Hood. Johnston had already prepared plans for a counter-attack, and his successor followed these plans on 20 July in the Battle of Peachtree Creek. This failed to stop the Union advance and the Confederates withdrew into the final Atlanta defences. Hood began the Battle of Atlanta on 22 July by throwing his best troops, under William J. Hardee, against McPherson's section of the Union Army. The assault was repulsed with a loss of about 8,000 Confederates and 3,700 Union troops, the latter including McPherson. Sherman now sent his cavalry, 6,000-strong, to outflank Atlanta and cut rail links; this failed, but so too did a counter-attack at Ezra Church on 28 July. Siege continued until Sherman swung round Atlanta and sliced the Confederate rail links south of the city on 31 August. Hood evacuated during the night; Sherman marched into the city on 1 September. Plans for the next Union move were prepared during September and October, while Hood's Confederate Army moved west and north to attack Sherman's communications. To counter this Sherman divided his forces: he sent Thomas's Army of the Cumberland back to deal with Hood, and he himself prepared to advance further into the south with 60,000 men. By doing so he would abandon his communications and live off the country until he reached Savannah and the coast. On 12 October Grant wired his approval: 'You will no doubt clean the country where you go of railroad tracks and supplies.' On 15 November Sherman proceeded, in his words, to 'cut a swath through to the sea'. He advanced on a 50-mile front and by 9 December had covered the 300 miles to Savannah. Confederate defenders of the city under Hardee were forced to evacuate

on 21 December. Although non-combatants were usually treated with respect, Sherman's march to the sea formed an example of the 'total' form of war which emerged in the final stage of the American Civil War; non-military targets were considered as important as the opposing army.

Atlantic, Battle of First World War. By 1914 Germany had a submarine fleet of about 70 vessels, a number of which were diesel-powered. The submarine war began with the sinking of 3 British cruisers by U-boat 9 off the Dutch coast on 22 September 1914; operations increased after 4 February 1915. German submarines were obliged to use their periscopes rather than undertaking surface attacks, owing to pressure from surface hunters; this made it more difficult to distinguish British vessels from neutrals, and from the beginning the latter were involved: a Norwegian vessel was sunk on 19 February and the US tanker 'Gullflight' torpedoed on 1 May. US public opinion was incensed by the sinking of the liner 'Lusitania' on 7 May: among the 1,198 passengers drowned were 124 Americans. This incident, followed by the sinking of the British liner 'Arabic', 19 August, provoked such an American outcry that Germany announced on 1 September that she would cease unlimited submarine war. The Germans still managed to destroy 1 million tons of shipping in the period 1915-16. Britain equipped merchantmen with 12-pounder guns, but the entire Merchant Navy could not be so armed until autumn 1916. This eventual protection forced the German submarines to seek security through depth, with U-boat commanders having to rely to an even greater extent on periscope sightings. The German Naval Command, headed by Tirpitz and Scheer, therefore began pressing for a return to unrestricted submarine warfare. They calculated that Britain would sue for peace within 5 months - before US intervention could be effective. Unrestricted submarine war reopened on 1 February 1917. Ships lost rose from 181 in January to 259 in February, 325 in March and 423 in April. Britain attempted to retaliate with accelerated mine development, depth charges and detection devices such as the hydrophone, but the convoy system was ruled out by the Admiralty on the grounds that this would present a larger target and would waste vital cruisers and destroyers. America joined the war on 6 April, following the sinking of several US ships, but US troops needed transporting, using up even more tonnage. However, the convoy advocates received a powerful supporter in Admiral William S. Sims, commander of US naval operations in the Atlantic. These advocates, already including the influential Beatty, argued that the size of a convoy was still small in proportion to the total sea area, and that every time a convoy slipped through about 40 ships would escape; the concentration of shipping made escort duties easier and convoys could be more easily deflected from danger areas. Opposers of the system included the First Sea Lord, Jellicoe, even though he had warned in February 1917 that Britain would run out of food and other raw materials by July. Prime Minister Lloyd George insisted upon a convoy trial which began on 10 May. By the end of October 1917, 99 homeward convoys, totalling over 1,500 vessels, had reached safety; only 10 vessels had been lost in convoy formation. In addition, Britain developed better offensive measures, including hunter-vessel packs and wider mine distribution: about 15,700 mines were laid in the Heligoland Bight during 1917 and 21,000 in 1918. By 1918 a U-boat operating from Flanders could only hope for 6 voyages before being destroyed.

Atlantic, Battle of, Second World War, Britain introduced convoys from the start, but lacked escort vessels. In July 1940 Britain had to divert shipping from the approaches south of Ireland to the longer route via Northern Ireland; in the week ending 22 September 1940, 27 vessels were sunk - more than in any 7 days during the First World War. Already, by 15 August, 212 million tons of British shipping had been destroyed. German U-boats operated in 'wolf packs' of up to 20 submarines, under the central direction of Admiral Doenitz. British losses steadily mounted: by June 1941 about 5.7 million tons of shipping had been sunk, whereas British shipyards could only build 800,000 tons as

replacements. Britain tried to retaliate by increased aerial protection, but the U-boats moved beyond aircraft range. In September 1940 Britain attempted to find an answer through the use of an escort aircraft carrier: the first of these, HMS 'Audacity', was a merchant ship modified to carry 6 aircraft. The 'Audacity' was sunk in December. Churchill successfully sought to buy old destroyers from America, but US assistance was restricted through the country's neutral status; she did however undertake limited escort and patrol duties in the western Atlantic. Added to the U-boat menace was the offensive waged by long-range German bombers and the constant threat by Germany's huge capital ships, including the 'Bismarck' until this vessel was sunk in May 1941, and the 'Tirpitz'. The situation remained desperate until America's entry into the war, December 1941. US involvement ultimately tipped the scales through provision of merchant and escort shipping and through the employment of far greater numbers of hunter weapons. Allied merchant losses in the Atlantic and Arctic in 1942 totalled 1,027,000 tons, but during the year 85 U-boats were sunk. The situation shifted back in Germany's favour during early 1943, with 108 allied merchantmen sunk at a cost of only 15 U-boats up to the end of March, but closer Anglo-US co-operation led to more efficient hunting techniques; production of faster transports and escorts steadily rose. By the end of 1943, allied 'kills' had passed German replacement ability; between May and September, 3,546 merchantmen in 62 convoys had crossed the Atlantic without loss.

Atomic warfare, general development In 1896, Antoine Henri Becquerel, 1852-1908, discovered radio-activity, providing the first evidence of a source of energy within the atom exceeding its chemical energy. In 1919 Ernest Rutherford, 1871-1937, disintegrated the nucleus of the nitrogen atom with alpha particles from radium; by 1940 scientists in Germany, Britain and America were working on the atom bomb project. This weapon, code-named by the allies 'Tube Alloys' and with overall development known as the Manhattan project, became a clear possibility as the war continued. Churchill and Roosevelt agreed in June 1942 that allied development should take place mainly in the USA. Anglo-US co-operation suffered setbacks: General Leslie Groves, executive agent of the US Military Policy Committee, which handled all atomic research construction work, became increasingly concerned over security aspects, and Dr James Conant, Chairman of the National Defense Research Committee, deplored the fact that the US effort amounted to 90 per cent of the whole. On 13 January 1943, Dr Conant completed a paper which proposed the British should be given no more information about electro-magnetic separation, about heavy water production, fast neutron reaction, or about the actual manufacture of the bomb. More harmonious relations were restored after the Quebec Summit Conference, August 1943. The first live test of the atomic bomb was made in New Mexico on 16 July 1945: on 6 and 9 August the bombs were dropped on Hiroshima and Nagasaki. Russian scientists exploded their first atomic bomb in 1949; on 16 October 1964 the Chinese exploded a low-yield atomic device. Developments to increase destructive power had already resulted in the first hydrogen-bomb explosion in 1953, undertaken by the Russians in Siberia. Nuclear research also led to atomic power: the US submarine 'Nautilus', completed in 1954, was the world's first nuclear-powered ship.

Auchinleck, Sir Claude John Eyre, 'The Auk', 1884- British Field-Marshal. Served in First World War; served for long periods in India between the wars; C-in-C India at outbreak of Second World War, but returned to England in late 1939; GOC Northern Norway, 1940; C-in-C India, January 1941, after period as GOC-in-C Southern Command, England; chosen by Churchill to replace Wavell as Middle East Commander, July 1941 (Map 14). Auchinleck withstood pressure from Churchill to launch a premature offensive in the North African Desert Campaign; he began his 'Crusader' offensive against Rommel south of Tobruk on 18 November. The battle lasted until 20 December, with Auchinleck displaying the utmost

determination, and with Rommel finally falling back to El Agheila. But Rommel's victory at Gazala, May 1942, led to the withdrawal of the 8th Army to the El Alamein positions. Auchinleck assumed personal command of the 8th Army and rallied the troops at Alam al Halfa ridge, July. His defensive techniques were later largely adopted by Montgomery. Auchinleck was replaced by Alexander, 15 August. He returned to India as C-in-C, 20 June 1943; appointed Field-Marshal 1946 and Supreme Commander, India and Pakistan, 1947.

Auerstedt and Jena, Battles of, 1806 Napoleonic Wars (Map 1). Both were fought on 14 October. Prussia's army was outdated, with officers largely ignoring the new flexible tactics introduced by the French, preferring the old-fashioned methods of Frederick the Great - rigid lines relying upon massed volleys. Prussia stood apart while Napoleon defeated the Austrians at Ulm and Austerlitz in 1805. Napoleon increased his pressure on Prussia during the following months, and finally, in September 1806, Frederick William ordered full mobilization, even though Prussia would now have to fight without allies. Moreover, the Prussians allowed Napoleon the initiative: the 100,000 Prussian troops would be outnumbered; Napoleon advanced into Prussian territory with 160,000, and by 3 October had deployed his regiments in south Prussia ready for a move on Berlin. The Prussian Army, spread between the French and Berlin, comprised 3 main field corps. The first, about 20,000 strong, was commanded by the Duke of Brunswick; the second, under Frederick Louis, Prince of Hohenlohe, totalled about 65,000 men; and the third, about 25,000, was led by General von R chel. Scharnhorst, Brunswick's able Chief of Staff, complained on 7 October: 'What we ought to do I know right well. What we shall do, God only knows.' Finally, after a clash between Hohenlohe's advance guard and French regiments on 10 October, the Prussians decided on retreat. The route was based on Auerstedt, Freiberg and Merseburg. Hohenlohe was ordered to provide a flank force while the main army under Brunswick moved from Auerstedt. By the evening of the 13th Hohenlohe's army lay east of the forest of Jena. Hohenlohe believed the main French army was moving towards Dresden, away to his east and he neglected to occupy in strength the Landgrafenberg plateau overlooking Jena. Napoleon had guessed Prussian intentions. He planned to lead his main army north over the Saale in the Jena region, while farther to the north-east the French 1st and 3rd Corps under Davout would cross the Saale in the Auerstedt area between Kosen and Naumberg. Early on 14 October Brunswick's regiments began to retreat from Auerstedt. Soon after dawn French cavalry squadrons advanced over the Saale at K sen and blocked the Prussian advance guard; by 8 a.m. Davout had deployed almost 3 divisions across the river, and the Prussians never recovered from this determined French move. Arguments intensified at the Prussian headquarters, leading regiments were starved of reinforcements, and confusion reached a peak when Brunswick fell fatally wounded. By noon a French division under General Morand was moving south of the Prussians; another division under General Gudin pushed at the centre; and a third under Friant curved round the north. Frederick William believed Hohenlohe to be still intact at Jena and decided the main army should join this flanking force. Retreat therefore began at about 5 p.m. with the Prussian regiments falling into increasing chaos. By nightfall Frederick William had reached Mattstedt, where he heard the result of the Battle of Jena. Napoleon had attacked Hohenlohe at 6 a.m. under cover of fog. Troops under Marshal Louis Gabriel Suchet, General Gazen and Soult pushed forward over the Landgrafenberg plateau; at 9 a.m. Napoleon ordered a halt to allow his forces to regroup, but Marshal Ney continued his advance in the centre. Napoleon reinforced Ney with troops under Henri Gratien Bertrand and Lannes; the latter's regiments came face to face with 20,000 Prussian infantry under General von Grawert. These Prussians were deployed in rigid close-order lines, extremely vulnerable to the concentrated French fire which they suffered for 2

terrible hours: this senseless sacrifice epitomized Prussia's whole outdated attitude to war. Along the whole battle front the Prussians started to collapse; French skirmishers swarmed forwards; Hohenlohe had used all his reserves, while Napoleon still had 42,000 men uncommitted. The 3rd Prussian Army under Rüchel, advancing from the north, came far too slowly. Rüchel reached the battlefield at 2 p.m. and deployed in rigid line; his troops were immediately subjected to concentrated French artillery fire, and within 15 minutes had suffered 50 per cent casualties. Rüchel was fatally wounded. By 4 p.m. the Prussians were in full retreat. In one day each of Prussia's 3 armies had been shattered. The Prussians lost some 22,000 men killed or wounded, 18,000 prisoners and 200 guns. French casualties were about 12,000 killed or captured. The remains of Prussia's forces fled north, with the last survivors surrendering at Lübeck on 6 November after a courageous withdrawal by Blücher and Scharnhorst.

**Austerlitz, campaign and Battle of, 1805 Napoleonic Wars (Map 1).** The Austrian, Russian and Swedish allies planned first to destroy Masséna's army in Italy - 50,000 men - then to move westwards towards the Rhine and France. Napoleon advanced from the English Channel area with his Grand Army, 200,000 strong, to disrupt such a move, concentrating upon General Mack von Leiberich's Austrian Army of 50,000 men which invaded Bavaria on 2 September and marched towards Ulm. Napoleon drove forward on a wide front, crossing the Rhine in late September to catch the allies off-balance. His forces reached the Danube on 6 October and, while Murat's cavalry demonstrated in front of Mack at Ulm, 6 great columns of the Grand Army swept north and east of the Austrian commander in a wide concentric arc. On 17 October, his communications severed, Mack surrendered with nearly 30,000 men. Napoleon immediately thrust into Austria, driving 120,000 Russians under Kutuzov before him and occupying Vienna at the beginning of November. On 15 November he advanced north in Moravia, leaving 20,000 men to hold Vienna. He now had 65,000 men, positioned in the midst of his enemies. Archduke Ferdinand, with 18,000 Austrians, lay to the north-west at Prague; to the north-east lay Russians and Austrians commanded by Kutuzov; to the south were 80,000 Austrians, under the Archdukes Charles and John. Kutuzov wanted the allies to continue withdrawal, thus extending Napoleon's communications, but was overruled. Instead on 28 November the allies began to move upon the French Army, positioned 2 miles west of Austerlitz. Napoleon deliberately overstretched his right wing, to make it appear weak as a further inducement for the enemy to attack. The allies obliged, attempting to move between Napoleon and Vienna. Battle began early on 2 December; by 9 a.m., one-third of the allied army was pressing against this sector, despite warnings from Kutuzov that the offensive was premature. While the battered French right continued to draw enemy strength, Soult's corps in the French centre was ordered forward to split the weakened allied front. Soult then encircled the allied left and drove it back, assisted by Davout. Meanwhile, further French troops hammered through the gap made by Soult and Lanne's corps struck against the allied right. By nightfall the French victory was complete, at a loss of 9,000 men. Austro-Russian losses were 26,000 plus 185 guns. Austria abandoned the coalition against Napoleon after the Treaty of Pressburg, 26 December. France gained domination over western and southern Germany; next year, with the Russians having retired back into Poland, Napoleon turned on Prussia in the Auerstedt campaign.

**Austro-Prussian 'Seven Weeks' War, 1866 (Map 5)** The conflict arose through Austria's determination to block Prussia's growing power in central Europe. On 14 June 1866 Austria condemned Prussia's occupation of Holstein, which had taken place in 1848 following a Prussian-inspired revolt in this Danish province. The Austrian government also objected to a treaty which the Prussian Chancellor, Bismarck, had concluded with the French. Bismarck took the Austrian outburst as a declaration of war. Prussian forces were fully

prepared as a result of careful planning by the Chief of General Staff, Moltke, who had worked out in detail schemes for mobilization and deployment based on the railway network. Four Prussian armies moved forward over a 275-mile front. In the north General Vogel von Falkenstein entered Hanover with 50,000 men; into Saxony and Silesia advanced Crown Prince Frederick William's 2nd Army moving from Landeshut, together with Prince Frederick Karl's 1st Army from Görlitz and General Karl E. Herwarth von Bittenfeld's Army of the Elbe. The point of Prussian concentration was Gitschen. The Austrian Army was believed to be one of the best in the world; its cavalry was considered superb, and its rifled field-guns were superior to the Prussian artillery. But the Austrian general staff was inferior to the Prussian, and the Austrian infantry was armed with muzzle-loading rifles which were completely outclassed by the Prussian needle-guns as developed by Dreyse. The Prussian Army of the Elbe occupied Dresden on 19 June, then advanced through the Bohemian Mountains to unite with the 1st Army; these two armies reached Gitschen on 29 June. The Prussian 2nd Army reached a point just east of Gitschen on 30 June after surviving stiff Austrian attacks at Trautenau and Nachod on the 27th. Also during these hectic days, Falkenstein's army in Hanover succeeded in outmanoeuvring an Austrian force under General Alexander von Arentschildt, with the latter surrendering on 29 June. In Bohemia the 1st and 2nd Prussian Armies and the Army of the Elbe organized themselves for battle far quicker than their Austrian opponents. This battle began on 3 July at Sadowa: a crushing Prussian victory effectively ended the war. The Treaty of Prague, 23 August, was highly beneficial to Prussia, who became the leader of a new North German Confederation. Moltke's reputation had been established, and he continued to improve the Prussian forces prior to the Franco-Prussian War, 1870.

**Bacteriological warfare - see Chemical and bacteriological warfare (CBW)**

**Baden-Powell, Robert Stephenson Smyth, 1st Baron, 1857-1941** British General. Served in India, 1878, and thereafter in South Africa. Wolseley, appointed C-in-C of British Army in 1895, included Baden-Powell in an expedition to West Africa during the same year. In 1896 he was appointed Chief Staff Officer to Sir Frederick Carrington when the latter's troops dealt with the revolt of the Matabele in the British South African Company territory north of the Transvaal. Baden-Powell commanded the 5th Dragoon Guards in India, 1897 to July 1899, when he returned to South Africa. Hostilities with the Boers were clearly imminent (Map 7): Baden-Powell was appointed C-in-C North West Frontier Forces and ordered to raise two regiments from the white settlers in Bechuanaland. Baden-Powell defended Mafeking for 215 days, from 13 October 1899 to 17 May 1900, when he was relieved by a flying column under Major-General Bryan T. Mahon. Later assessments downgraded the defence of Mafeking: its political significance at the time, when Britain desperately needed some success to outweigh the general humiliations of the Boer War, far outrated its military importance. Baden-Powell claimed he tied up large numbers of Boer troops who would otherwise have been involved elsewhere, but these probably never rose above 6,000. Baden-Powell was appointed Inspector-General of Cavalry in 1903; he left the Army to found the Boy Scouts movement in 1908.

**Balaklava, Battle of, October 1854** Crimean War (Map 4). The action followed the attempt of the Russian commander, Menshikov, to break between the allied forces besieging Sebastopol and the British base at Balaklava. The battlefield centred on the road running south-east from Sebastopol which crossed Balaklava plain on a narrow ridge known as the Causeway Heights. Beyond the ridge lay North Valley with the Fedioukine Hills rising on the Sebastopol side. Southwards of the ridge was South Valley, with Balaklava base on its southern edge. Raglan, commanding the allies jointly with the French General Francois Certain Canrobert, had constructed 6 redoubts on the road along Causeway Heights; each had a 12-pounder naval gun manned by Turkish troops. But insufficient account

had been taken of a report by a Turkish spy, made the evening before the battle, that 20,000 Russian infantry and 5,000 Russian cavalry were marching on Balaklava. The attack began on the 6 redoubts soon after dawn, 25 October. By mid-morning 4 of the redoubts had fallen and British reinforcements under Sir George Cathcart advanced too slowly. Meanwhile the British cavalry, comprising the Heavy and Light Brigades under Major-General G. C. Bingham, Lord Lucan, had to pull back. Raglan ordered him to take the cavalry to the west of the battlefield, even though Lucan would then be unable to provide fully effective support for the 93rd Highland Division in South Valley, the only remaining force standing between the advancing Russians and the Balaklava base. The division, commanded by Sir Colin Campbell, consisted of 550 men of the Argyll and Sutherland Highlanders; against them advanced a section of the Russian cavalry. The subsequent defence by the Highlanders has been immortalized as 'the thin Red Line': this section of the enemy cavalry eventually wheeled away, but the main Russian cavalry continued to advance towards Balaklava base. Lucan ordered a charge by the Heavy Brigade, commanded by Brigadier-General Lord James Scarlett. The latter's force, comprising the Scots Greys, Inniskillings and 5th Dragoon Guards, was heavily outnumbered by the 3,000 enemy cavalrymen, but nevertheless repulsed the Russians. During this action the Light Brigade, under Brigadier-General James Thomas Brudenell, Lord Cardigan, had stood inactive: Cardigan had not been given specific orders to support the Heavy Brigade and declined to use his own initiative. Battle activity dwindled for the moment: Lucan merely moved the Light Brigade to a position across the end of the North Valley, with the Heavy Brigade behind them to the right. The British headquarters, situated behind the Light Brigade on the extreme west of the battlefield, observed that the Russians were dragging away the captured naval guns from the redoubts on the Causeway Heights. Raglan immediately sent an order to Lucan to advance the cavalry and prevent these guns from being carried away. Lucan, unable to see the Causeway Redoubts from his position in North Valley, assumed the order referred to Russian artillery lined at the far end of North Valley; he passed the order to Cardigan, who argued that a charge down the valley would be directly against the Russian guns and would also be exposed to batteries and riflemen on each flank. The disastrous charge of the Light Brigade nevertheless began, against the wrong target. Of the 673 men who rode into the 'Valley of Death', less than 200 returned. The Russians maintained positions on the Causeway Heights; they attacked again 11 days later in the battle of Inkerman.

Ballistic Missile Defence (BMD) - see Anti-Ballistic Missile defence (ABM)

Balloon Françoise Rozier became the first man to ascend in a lighter-than-air craft when he made a short journey in a Montgolfier-designed balloon on 15 October 1783. A balloon was first used for military observation at the Battle of Fleurus, June 1794. The invention caused widespread interest in France during the Revolution, with schemes being drawn up to carry as many as 3,000 troops. A French balloonist corps was formed for observation duties. Soon after 1800 John Sadler became the first known Englishman to make an ascent. Interest faded after 1814, until 1849 when Venice was besieged by the Austrians: the latter attempted to drop small bombs from balloons, using a time fuse, but the experiment - organized by Lieutenant Franz Uchatius - proved a failure. Balloon development nevertheless continued, stimulated by the introduction of the more effective coal gas. Devices were used during the Franco-Prussian War, largely owing to inventor M. Godard: the French dispatched messages by balloon during the siege of Paris, and the political leader Gambetta escaped from the city in one of these craft on 11 October 1870. Observations balloons were used in the First World War, but were rendered obsolete by the related airship and by the development of aircraft.

Battenberg, Prince Louis Alexander of, Marquis of Milford Haven, 1854-1921 German-born nobleman, becoming naturalized British

subject. C-in-C Atlantic Fleet, 1908-10; First Sea Lord, 1912-14, during final build-up of Royal Navy prior to hostilities with Germany, with this accumulation of strength centred on the Dreadnought battleship; resigned in October 1914 following anti-German protests over his ancestry, and for the same reason renounced title of Battenberg, 1917, with his family choosing instead the surname Mountbatten. His eldest son, George Louis Victor Mountbatten (1892-1938), fought at Heligoland, Dogger Bank and Jutland. For younger son, see Mountbatten.

Battlecruiser Warship designed to combine battleship fire power with greater mobility; guns were therefore almost equal to battleship armaments, but armour protection was reduced. HMS 'Indomitable', 1907, represented the prototype of this class; HMS 'Lion', 1910, was an example of the most modern battlecruiser prior to 1914. This vessel, Beatty's flagship at Jutland, had eight 13.5-inch guns and sixteen 4-inch; midships armour was 9 inches thick, bow and stern 4 inches thick. By comparison, the Queen Elizabeth class of British battleship, the ultimate Dreadnought type, had eight 15-inch guns and twelve 6-inch; the bulk of her armour was over 6 inches thick, increasing to 13 inches on the hull. Battlecruisers featured at Jutland, 1916, with the British having 9 of these vessels and the Germans 5; the British also had 8, less powerful, armoured cruisers. Production continued after the war, with the lower tonnage being a means of circumventing restrictions imposed by the Treaty of Versailles and subsequent naval agreement. In 1939 the British had 18 battleships and battlecruisers; the French total was 11 and German strength comprised 2 battleships being built and 5 'pocket' battleships already operational. The latter fell into battlecruiser specifications; they comprised the 'Scharnhorst' and 'Gneisenau' and the 3 Deutschland-type vessels - 'Deutschland', 'Admiral Scheer' and 'Graf Spee'. The Deutschland class had been started in 1928, officially with a displacement of 10,000 tons, the limit set by the Versailles Treaty, but actually 11,700 tons. 'Scharnhorst' and 'Gneisenau' were started in 1935, when Hitler rejected the Versailles clauses; these displaced 31,800 tons. 'Scharnhorst' was sunk in December 1943; 'Gneisenau' was damaged in 1942, putting her out of action for the rest of the war. Pride of the British battlecruiser fleet was 'Hood', built in 1918; she was destroyed in the fighting with the German battleship 'Bismarck', May 1941. Already the navies of the major powers were turning towards faster and lighter armed ships such as heavy cruisers, which had 8-inch guns, light cruisers, with 6-inch guns and the smaller and lighter armed destroyers.

Battleship Origins can be seen in the ironclads such as the 'Merrimack' and 'Monitor' and in Britain's 'Minotaur' of 1863: the latter was armed with 9-inch muzzle-loading guns. As guns increased in power, so armour became thicker and stronger. Germany's 'Fuerst Bismarck' of 1898 represented a new concentration of power: this 10,000-ton vessel was armed with 9-inch breech-loading guns, plus smaller guns, 6 torpedo tubes, and had an extensive armour belt. Warships were rapidly becoming ponderous gun platforms. By now the Anglo-German naval race was beginning; in 1897 Tirpitz had become head of the German Navy; the 'big-ship' ideas of the US naval theorist Mahan became increasingly influential. In December 1905 the keel of the first British Dreadnought was laid at Portsmouth, and this massive warship was completed in record time by October 1906: she had ten 12-inch guns and twenty-seven 12-pounders - the previous most heavily-armed battleship had only had four 12-inch guns. The Dreadnought design was influenced by work being undertaken in Italy, for example studies made by Vittorio Cuniberti for guns with all-round arcs of fire - Cuniberti's advanced ideas were incorporated into the Italian battleship 'Leonardo da Vinci' eventually launched in 1911. Britain, stimulated by the race with the Germans, went ahead at an accelerating pace. Three battleships of the Dreadnought class were laid down in 1907 and two in 1908. The size of guns was increased from 12-inch to 13.5-inch in 1909, thus raising the British shell from 850 to 1,400 pounds; Churchill insisted the size



should be further increased to 15.75 inches, accomplished in the ultimate Dreadnought development represented by HMS 'Queen Elizabeth'. This warship had eight 15-inch guns, each capable of firing a 1,920-pound projectile 35,000 yards: a broadside from the 'Queen Elizabeth's' eight guns totalled 16,000 pounds. By 1914 Britain had 5 of these super-Dreadnoughts and 35 other Dreadnoughts and older battleships; Germany had a total battleship fleet of 35. The two main fleets met at Jutland, 1916, but all battleships except one old German vessel survived. The Treaty of Versailles, June 1919, limited the number of German battleships to 6 old vessels; when these became unfit for further service they would have to be replaced by cruiser-size ships of 10,000 tons with 11-inch guns maximum. The Washington Treaty of 1922 agreed not to build capital ships for ten years and to apportion capital ship tonnage at the ratio of 5 American and British to 3 Japanese to 1.7 French and Italian. In 1931 the first of 3 German 'pocket' battleships was launched - the 'Deutschland'. Officially designated as displacing 10,000 tons, she was actually 1,700 tons over the Versailles limit. In March 1935 Hitler repudiated the Versailles Treaty, but in June an Anglo-German Naval Treaty was drawn up, with Germany limiting herself to 35 per cent of British naval power. The treaty allowed each country 5 battleships. In 1936 a German building programme was started, based on the last 2 battleships to be built with conventional-power engines - the 'Bismarck' and the 'Tirpitz'. Neither was completed by 1939. Each had 15-inch guns and they displaced 41,700 and 42,900 tons respectively; the British and US capital ships were still limited to 35,000 tons as laid down at the Washington Conference. But battleships proved more of a threat than a positive destructive force during the Second World War. Air power reduced their effectiveness; aircraft carriers assumed the role of the most powerful capital ships. At the start of the war Britain had 18 battleships and battlecruisers, the most powerful being the 'Prince of Wales' and 'Repulse' - both sunk by Japanese aircraft in December 1941. The 'Bismarck' was sunk on her maiden voyage in May 1941, the 'Tirpitz' in November 1944. The Japanese battleships 'Yamato' and 'Musashi' were the largest ever built, with lengths of 863 feet, beam 127 feet, standard displacement 64,000 tons; the main armaments consisted of nine 18.1-inch guns. The 'Yamato', built from 1937 to 1941, was sunk during the Battle of Leyte Gulf, October 1944, in the Philippines campaign. The major powers laid up surviving battleships after 1945: one of the 4 'mothball' battleships in the US Navy was temporarily brought back into service during the Vietnam War to act as a gun platform for off-coast shelling.

Bautzen, Battle of, May 1813  
Napoleonic Wars (Map 1). The Prussian and Russian Allied Armies withdrew eastwards after the Battle of Lützen had opened the 1813 campaign, despite complaints from the Prussian commander, Blücher, that they should stand and fight. The overall commander, Prince Wittgenstein, allowed Napoleon to enter Dresden on 11 May. Allied disagreements continued: Frederick William III of Prussia insisted Berlin must be defended; Alexander, Tsar of Russia, wished to keep his army as close to the homeland as possible. The Allied Army reached Bautzen on 14 May but remained inactive. Preliminary French manoeuvring began on 19 May. Ney was first ordered to advance on Berlin but Napoleon later instructed him to move on Bautzen from the north. The allied position spread along the eastern bank of the Spree, with Blücher's 32,000 Prussians forming the right, or northern, flank around the village of Kreckwitz, and with the Russians deployed farther south around Lobau. Napoleon ordered a frontal attack to be launched from Bautzen on the 20th; Ney would be in a position to undertake a flanking attack from the north on the 21st. The French established a firm foothold over the Spree during the 20th, with the fighting fiercest in the Russian sector. Battle began again early on the 21st with a French artillery bombardment along an 8-mile front, followed by a determined infantry advance. Blücher received reports of Ney's advance and urged a cavalry offensive;

Wittgenstein refused, and instead ordered withdrawal late in the afternoon, much to Blücher's disgust. Lack of cavalry prevented a firm French pursuit, and French casualties were higher than those of the allies: about 22,500 against 11,000. Vigorous allied counter-attacks shattered the French advance guard at Reichenbach and at Haynau. General Barclay de Tolly took over from Wittgenstein on 26 May, but followed the same withdrawal policy. Napoleon needed time to recover strength and the two sides agreed to a truce on 1 June. This armistice was extended until 20 July and later to 16 August, when the gigantic Leipzig campaign began.

**Bayonet** The name of this infantry weapon originated from the city of Bayonne, southern France, famous for its cutlery. Initially the bayonet was over a foot long, inserted into the muzzle of the musket - hence known later as a 'plug bayonet': this had the obvious drawback of preventing the musket from being fired whilst it was in place. The socket bayonet was introduced by the French towards the end of the seventeenth century: this contained a sleeve fitting round the barrel and locking into place with a slot and stud. The socket version became standard for most European armies shortly after 1800 and remained so for about 150 years although with the size of the blade decreasing. Bayonets were extremely valuable for use during the long reloading period, and they could also be employed as a 'hedge' around the infantry square to give added protection, especially against cavalry charges. They could be effective in an infantry advance, although actual bayonet charges were rarely attempted unless the enemy was already in flight or appeared about to be. In a line advance the unprotected left arm of each infantryman was protected by the bayonet of his left-hand man; bayonet thrusts took less time than sword slashes and resulted in less disturbance to the rigid line. Thrusts were also considered more injurious, in that they penetrated into the body of the victim rather than cutting the exterior as with sword wounds. Moreover the techniques of bayonet fighting were relatively simple, able to be acquired in minimum time by recruits. This weapon decreased rapidly in importance with the introduction of repeating rifles and machine-guns, after which bayonets were only used for extremely close-quarter fighting - especially when silence was essential - or when all ammunition had been expended.

**Beatty, Sir David, 1st Earl, 1871-1936** British Admiral of the Fleet. Served in the Sudan, 1885, operating on the Nile close to Omdurman battlefield. Naval Secretary to First Lord of the Admiralty Churchill, 1911-13; Commander, battlecruiser squadron, 1913-17. Beatty led the action at Heligoland, January 1915, and was engaged heavily at Jutland, 1916; appointed Commander of the British Grand Fleet, 1917, after Jellicoe became First Sea Lord. Beatty was among those who advocated the convoy system in the Battle of the Atlantic. First Sea Lord, 1919-27.

**Beaverbrook, Lord William Maxwell Aitken, 1st Baron, 1879-1964** Canadian-born British Minister. Chosen by Churchill to be Minister of Aircraft Production, May 1940. Production soared from 325 aircraft in May to 446 in June, 496 in July and 476 in August, giving a total of 1,745 aircraft when the Air Ministry had only believed 1,164 to be possible. But this accomplishment, whilst vital to the Battle of Britain, damaged other aspects of aircraft production including the development and supply of bombers. Beaverbrook was succeeded by John Moore-Brabazon, May 1941; he acted as Minister of State until June, when he was appointed Minister of Supply, remaining in this position until appointed first Minister of Production, February 1942. Uneasy relations with Churchill, despite their long friendship, led Beaverbrook to abandon this post 15 days later, with Oliver Lyttelton his successor. Beaverbrook journeyed to Russia and the USA, urging an early Second Front in Europe; he served as Lord Privy Seal from September 1943 to July 1945.

**Berlin Airlift, June 1948 to May 1949** Relations between the four powers who had occupied Berlin since 1945 - America, Russia, Britain and France - deteriorated during 1948, with the Western allies preparing to create the Federal Republic of (West) Germany and to introduce a new currency,

the D-mark. The Soviets ordered Berlin's mayor to accept their own new East German mark as currency for the entire city; deadline for acceptance was 6 a.m., 23 June 1948. The Berlin City Parliament refused. During the evening of 23 June the Soviets switched off electricity supplies; 'technical difficulties' halted passenger and freight traffic along road and rail links to Berlin. West Berlin had only enough food to last a month and coal for 10 days. General Lucius D. Clay, commander of the US occupation forces in West Germany, flew to the city on 25 June; President Truman supported his policy of full defiance of the blockade; so too did Britain's Prime Minister, Clement Attlee. Next day the first C-54 Skymasters landed, beginning the airlift; supervising the operation was General Albert C. Wedemeyer. Eventually 277,264 flights were made; the record day's lift was 16 April 1949, when 1,398 flights brought 12,940 tons, with landings every 63 seconds. The D-mark became the only legal tender of the western sector on 20 March 1949. The blockade was officially lifted on 12 May 1949, although the lift continued until 30 September. Over 2,300,000 tons were brought into the city; 79 pilots were killed in air crashes.

Berthier, Marshal Louis Alexandre, Prince of Neuchâtel, 1753-1815 Served under Lafayette on the colonialist side in the American Revolution; acted as a staff officer in the French Army prior to the Revolution, becoming an 'Ingénieur-Géographe' officer, with this branch of the engineers entrusted with drawing up deployment memoranda. He continued such service in the Army of the French Revolution. Berthier joined Napoleon during the Italian campaign, 1796, and became his closest staff officer, staying with him for the Egyptian campaign, 1798-1800. He acted as War Minister, 1800-8, then became Napoleon's Chief of Staff. His capabilities often fell short of Bonaparte's requirements but he rendered loyal service; he was named Prince of Wagram after the battle of that name in 1809; he accompanied Napoleon to Russia, 1812, attempting to deter the Emperor from advancing beyond Smolensk. After 1814 Berthier supported the cause of Louis XVIII.

Bismarck, Prince Otto Eduard Leopold von, known as the 'Iron Chancellor', 1815-98 German Minister. President of the Prussian Cabinet and Foreign Minister from 1862. He declared in 1862 that German problems must be solved by 'blood and iron'. These problems centred on the formation of the Germanic state. Prussia had occupied Schleswig-Holstein in 1848, but the Treaty of Berlin, 1850, restored full Danish rights in the disputed provinces; in 1864 Bismarck once again precipitated Prussian involvement in the area in order to obtain full Prussian ascendancy in north Germany. Prussian troops entered the provinces in 1864; Denmark sued for peace in August, renouncing her rights in favour of Prussia and Austria. Bismarck now moved to create a 'casus belli' with Austria, and the Austro-Prussian 'Seven Weeks' War began in June 1866 (Map 5). Prussia's shattering victory under Moltke enabled Bismarck to accept peace under his own terms: the Treaty of Prague, 23 August, excluded Austria from German affairs, with the German states north of the Main forming a new confederation under Prussian leadership. France reacted against Prussia's growing power, and the Franco-Prussian War began in July 1870 (Map 6). Bismarck's strong civilian leadership was well matched by Moltke's brilliant organization of the Prussian forces, and the French armies were defeated at Sedan, 1 September. Relations between Moltke and Bismarck, never very close, deteriorated over the question of a bombardment of Paris; Moltke objected to Bismarck's interference in military affairs, while the political leader criticized publicly the conduct of the war. Moltke submitted to political dictates, and the bombardment began on 5 January 1871. The city capitulated on the 28th; once again Bismarck and Moltke found themselves in opposition: Moltke saw the fall of the city as offering the opportunity for prosecuting the war in the provinces with greater effort; Bismarck wanted negotiations to begin, concerning himself with strict diplomatic objectives. His negotiations led to the Treaty of Frankfurt, 10 May: France agreed to cede Alsace and north-western Lorraine to

Prussia and to pay an indemnity of 5 billion francs. Bismarck had succeeded in establishing Prussia's predominance. In 1871 he became the first Chancellor of the new Germanic Empire. He presided over the International Congress of Berlin, 1878, and joined with Italy and Austro-Hungary in the Triple Alliance aimed at protecting Germany against France and Russia. He quarrelled with Kaiser William II and resigned in 1890.

Blitz, the Second World War. Concentrated German bombing against Britain began on 7 September 1940, with a raid on London by 300 bombers. Over 430 civilians died; over 600 tons of bombs were dropped - the highest total during the Blitz was to be 1,026 tons and 4,252 incendiary containers on 19 April 1941. London received another major attack on the 9th and the capital was hit in varying degrees each day until 3 November. The number of homeless Londoners rose to 17,000. In mid-October the Germans switched to mainly night raids. About 70,000 incendiaries were dropped on 15 October, the first time so many had been used, and nearly 1,000 fires were started; 400 civilians died. In early November the Germans turned from concentrated raids on London to attacks on a succession of provincial centres: Coventry was hit on 14 November, suffering widespread damage; the House of Commons was severely damaged on 6 December and on the 29th another massive incendiary raid struck the capital, causing 1,500 fires. During the 12 weeks from 19 February to 12 May 1941, only 7 out of 61 raids involving more than 50 aircraft were directed against London, the majority, 39, being aimed at Britain's western ports. The Chief of the Air Staff, Portal, claimed in March that air defence was improving: in December 1 bomber in every 326 had been brought down; in January 1 in every 110; in February 1 in every 95, and in the first 12 days of March 1 in every 63. Yet London suffered heavy damage on 16 April, known as 'The Wednesday', resulting in the death of over 1,000 civilians; 3 days later came the heaviest onslaught of the war on the capital, with another 1,000 civilians killed and 1,026 and 4,252 incendiary containers dropped. About 150,000 houses were destroyed or damaged in these two raids. Saturday 10 May saw the last and possibly the worst night of the main London Blitz, when the number of deaths reached their highest total, 1,436, and 2,200 fires were started. Sixteen enemy aircraft were destroyed, the maximum yet in night fighting. A second Blitz on London began in June 1944 with the V-bomber offensive. In all, about 60,000 British civilians died during the war; the German casualty figure from strategic bombing was over 600,000.

Blitzkrieg, 'Lightning War' A German form of armoured and aerial warfare devised prior to the Second World War, which reasserted the supremacy of the offensive. In essence, it depended upon a breakthrough and deep penetration by an armoured force, close supported from the air. Aircraft would inflict severe damage upon enemy communications and installations, would help the field artillery during the advance by attacking ground targets, and would keep the attacking force supplied. Tanks, backed by motorized infantry, would strike forward under this aerial shield. Concentration and speed would throw the enemy off-balance; surprise would breed shock; shock would lead to enemy disintegration, collapse of morale and retreat. The strategy reflected ideas put forward by the British theorists Fuller and Liddell Hart. Blitzkrieg showed its ruthless effectiveness in the invasion of Poland, 1939, and in the battle for France, May-June 1940; the greatest exponents were Guderian and Rommel.

Bloch, Jean de, 1836-1902 Polish banker and author. His 6-volume 'The War of the Future in its Technical, Economic and Political Relations' appeared in 1897; in 1899 the 6th volume was translated into English with the title 'Is War Impossible?', reprinted in 1900 with the title 'Modern Weapons and Modern War'. Many of Bloch's predictions proved accurate: future war would result in slaughter on such terrible scale that neither side would be able to force the issue; trench stalemate would ensue; decision would be reached through economic, non-military factors; victory would be hollow. Bloch, in direct contrast to military leaders prior to

1914 who insisted upon the continuing supremacy of the offensive, such as Foch, therefore gave an exact picture of the defensive deadlock of 1914-18. Blomberg, Werner von, 1878-1946 German General. Minister of War, 1933-8. Blomberg provided Hitler with enthusiastic support; on the day of President Hindenburg's death, 2 August 1934, Blomberg made the whole Reichswehr swear allegiance to the person of the new President and Supreme Commander, Hitler. He was thrown out by Hitler, 4 February 1938, on charges of having married a prostitute; Hitler himself took over Blomberg's position. Blücher, Gebhard Leberecht von, 1742-1819 Prussian Marshal. Blücher first served with the Swedes fighting against the Prussians in the Seven Years' War; taken captive, he entered Prussian service in 1760; he served on the Rhine, 1793-5 (Map 1); he attempted to rally the Prussian advance guard at Auerstedt, 14 October 1806, and played a leading role in the retreat of the remains of Prussia's army, with Scharnhorst his Chief of Staff. He was eventually obliged to surrender at Lübeck, 6 November. He encouraged Scharnhorst, Gneisenau, and others in their reforms of the Prussian Army. Blücher was appointed to command the Prussian Army of Silesia in 1813, with Scharnhorst and then Gneisenau his Chiefs of Staff, and displayed aggressive bravery at Lutzen and Bautzen in May, after which the war became one of manoeuvre until in October the allied armies converged on Napoleon at Leipzig. He urged relentless pursuit to Paris, but the allied monarchs hesitated and Napoleon was allowed time to recover. Blücher spearheaded the advance on New Year's Day 1814. The overall commander, Schwarzenberg, preferred a cautious approach and Napoleon seized upon the splintered allied advance. But the pressure became too great; Blücher entered Paris at the beginning of April. During the Waterloo campaign Blücher commanded the Prussian Army on the left of Wellington's Anglo-Dutch force; he prevented Napoleon from stabbing between the two armies at Ligny, 16 June 1815, during which battle Blücher was thrown from his horse and severely concussed. The 72-year-old Prussian commander recovered in time to lead his troops across country to assist Wellington at Waterloo, 18 June: without his help the Anglo-Dutch Army might well have been defeated. Blücher took Paris on 3 July. His primary attribute as a commander lay in his instinctive realization that the new, massive Napoleonic form of warfare necessitated maximum force being inflicted in minimum time at the most decisive point. Blücher relied heavily on the staff system; he provided the figurehead and inspiration while his Chief of Staff provided the planning background and forged the means for putting his ideas into operation. Boer War, 1899-1902, general (Map 7) The conflict was preceded by the Transvaal Revolt or First Boer War, 1880-1. On 30 December 1880 the Boer Republic was proclaimed by Paul Krüger and Petrus Jacobus Joubert, covering the area between the Orange and Limpopo Rivers in South Africa. Joubert inflicted defeat on the British under General Sir George Colley at Laing's Nek, 28 January, and Majuba Hill, 27 February. These victories, resulting from a vast underrating of Boer skill, led to the Treaty of Pretoria, 5 April: independence was granted to the South African Republic under British suzerainty. On 16 April Krüger became Boer President. In 1886 gold was discovered in the Boer Republic and foreigners - Uitlanders - swept in. These newcomers were denied full citizenship by Krüger, and appealed to Britain. Boer-British relations deteriorated, especially after the British fanatic Dr L. Starr Jameson led an abortive raid into Boer territory in 1895, attempting to spark an uprising among the Uitlanders. Boer-British talks took place during 1899, with the Boer delegation - led by Smuts - attempting to gain time for military preparations. By autumn 1899 vast quantities of Mauser rifles and considerable numbers of Krupp guns had been brought into the country; on 9 October Krüger issued an ultimatum for the withdrawal of British troops from the Boer borders. War began on 11 October. Boer forces totalled about 50,000 men; British forces at the outbreak only numbered about

14,700. The British clung to the old line formation in battle, men standing shoulder to shoulder; by contrast, the Boers were highly mobile mounted marksmen, armed with the modern repeating rifle and making maximum use of terrain; they struck quickly, then scattered before the unwieldy British forces could recover. Kitchener complained: 'The Boers are not like the Sudanese who stood up to a fair fight. They are always running away on their little ponies.' The Boers gained advantage from the British strategic reluctance to move far from rail communications, and from the British tactical method of attacking in massed ranks direct at the opposing force. The investment of British forces under Baden-Powell at Mafeking, and the besieging of Kimberley, led to the dispatch of British relief forces which could easily be attacked by the mobile Boers. A relief force under Methuen, aiming for Kimberley, managed to reach the Modder River, November 1899, but was defeated at Magersfontein in December after making a frontal assault. Buller, leading a relief column towards Ladysmith, suffered similar defeat at Colenso, also in December, and was replaced by Roberts. The latter, with Kitchener his Chief of Staff, undertook an extensive reorganization of the Army. With these changes and the adoption of far more mobile British strategy and tactics, the second stage of the war began. This phase proved more successful, despite setbacks at Spion Kop and Vaal Kranz in January-February 1900. Ladysmith was relieved in late February and Mafeking in May. The Boer leader Cronje had already been obliged to surrender. Roberts returned home in December 1900 leaving Kitchener in command. Victory was eventually obtained through the use of overwhelming numbers of British forces - the final total reached about 450,000 - and through Kitchener's policies. The proportion of mounted infantry was increased; combined with added mobility was Kitchener's ruthless method of rounding up the elusive Boer enemy: the country was divided up by nearly 4,000 miles of barbed wire and 8,000 block-houses; each section was then swept by the mounted columns; farms were burnt and women and children herded into concentration camps - where some 20,000 people died of disease. Peace was signed on 31 May 1902. Total British casualties were nearly 6,000 dead and 23,000 wounded. Boer troop losses were nearly 4,000 killed. The inadequate performance of the British Army led to the 'Report of HM Commissioners on the War in South Africa', published in 1903, which condemned aspects of the whole British military machine ranging from the C-in-C, then Wolseley, down to the man in the ranks. From this condemnation sprang the Esher Committee recommendations, 1904, and the movement under Haldane to create an army better fitted for service in a European war.

**Bolshevik Revolution, 1917 - see Russian Revolution, 1917-21**

**Borodino, Battle of, October 1812; also known as the Battle of Moscow or the Moskva**

**Napoleonic Wars (Map 1).** The battle marked the turning point in Napoleon's attempted conquest of Russia and, in turn, the failure of this campaign represented the beginning of Napoleon's downfall. Kutuzov had taken over command of the retreating Russian Army at the end of August, replacing Barclay de Tolly. The latter was in disgrace through failing to stop Napoleon, but his successor was also reluctant to fight a battle: Kutuzov believed that retreat into Russia would be the best means of defeating Napoleon, by overextending the French forces. However, under pressure from Tsar Alexander, Kutuzov reluctantly made a defensive stand near the small village of Borodino, 70 miles west of Moscow. Total Russian strength was about 128,000 men, with 640 guns; opposing them were about 130,000 French with 587 guns. Napoleon began the battle at 6 a.m., 7 October, with a heavy artillery bombardment followed by an infantry advance. The battle centred on the Russian Great Redoubt, with Napoleon eventually concentrating over two-thirds of his total artillery on bombarding this defensive position. Despite terrible casualties, the French forced back the Russians on the left; General Pyotr Bagration, commanding the flank, ordered a counter-attack against French forces under

Davout, but the offensive failed to make ground and Bagration was himself fatally wounded. The French focused even more attention on the Great Redoubt; this fell at 3 p.m., but was retaken by the Russian Guard. The French attacked again with 200 guns, and although repeated assaults resulted in appalling losses, they took the Redoubt with cavalry support. The Russians made counter-attacks, but in the late afternoon retired to a ridge slightly to the rear. Casualty estimates are unreliable, but the Russians probably lost 44,000 dead and wounded, amounting to about 34 per cent of the forces committed to battle. The French probably lost more than 30,000 killed or wounded, making the battle one of the bloodiest one-day clashes in history. Many expected the struggle to be resumed next day, but Kutuzov decided to continue the retreat. He withdrew next day, leaving the battlefield - and Moscow - in Napoleon's hands. His strategy was to prove correct.

Botha, Louis, 1862-1919 Boer War General and political leader (Map 7). He was appointed to command Boer forces blocking the British advance on Ladysmith, December 1899, following the illness of Lukas Meyer. Botha, aged 37, immediately organized his forces for the Battle of Colenso, and after this victory he played a part in the successful Boer action at Spion Kop, 23 January 1900; he became the Boer C-in-C later in 1900 following the death of General Joubert. By this time the British had over 100,000 troops active in the war, against whom Botha could only muster about 30,000, but he continued to wage guerrilla warfare until early 1902. He took part in the peace talks which led to the Treaty of Vereeniging, 31 May 1902. Botha became the first Prime Minister of the Transvaal, 1907, and the first Prime Minister of the Union of South Africa, 1910, holding the latter position until 1919. In late 1914 and early 1915 he suppressed an uprising of Boer extremists, led by the former Boer General Christian De Wet, who were protesting over the Union of South Africa's declaration of war against Germany. Botha was helped in this suppression by Smuts. He obtained the surrender of German forces in south-west Africa, 1915.

Bradley, Omar Nelson, 1893- US General. Instructor at West Point, 1934-8; Commandant Infantry School, Fort Benning, 1941-2; Commander 82nd Infantry Division, 1942; Deputy Commander then Commander US 2nd Corps, Tunisia and Sicily, 1943; Commander US 1st Army in Normandy landings, 1944 (Map 13). Bradley broke out from the bridgehead at St Lô, 25 July, and on 1 August was appointed to command the newly formed US 12th Army Group which breached the German Siegfried Line, 21 October. He ordered Patton to make his dramatic shift in direction against the German southern flank in the Ardennes offensive during December; his troops took the Remagen bridge over the Rhine, 7 March 1945, and invaded south Germany to reach Prague by the end of the war. Bradley was Chief of Staff, US Army, 1948-9; on 16 August 1949 he became the first formally appointed Chairman of the US Joint Chiefs of Staff, and he remained at this post until his retirement, 14 August 1953.

Brauchitsch, Heinrich Alfred Hermann Walther von, 1881-1948 German General. Chief of Artillery, 1933; C-in-C German High Command, 1939; responsible for planning occupation of Austria and Czechoslovakia, the invasion of Poland and the offensive against France, May 1940; he opposed Hitler's direction of the Russian campaign, arguing against the proposal to seize the Ukraine before Moscow, summer 1941. Brauchitsch, suffering from ill-health, repeatedly sought to resign; Hitler agreed in late 1941 and took over as C-in-C German High Command himself. Brauchitsch was interned in 1945 and died in British captivity.

Breech-loading Loading from the breech end of a weapon had obvious advantages compared with loading from the muzzle: firing would be faster and it reduced the exposure time of the user during the recharging procedure; breech-loading infantry weapons would more easily enable the troops to lie behind cover. The main obstacle to be overcome was the prevention of escaping gas - obduration - round the joint between the breech and breechblock. British troops had their first breech-loaders during the American

Revolution, when a special corps under the command of Patrick Ferguson was equipped with weapons which he himself had invented. His device used a modification of the screw breech: a threaded plug which could be removed for inserting a new charge. This weapon still leaked gas and had the disadvantage of only allowing loose powder and ball to be fired. Meanwhile, Giuseppe Crespi of Milan invented a weapon with a tip-up breech; this allowed paper cartridges to be inserted. Improvements of this mechanism were made by the American John H. Hall; his weapon was adopted by the USA in 1819. But real advance could only come with the introduction of more efficient cartridges. This step was made by Johannes Samuel Pauly in Paris in 1812. He invented a cartridge with a brass head and a paper body: the soft head of the cartridge expanded with the detonation of powder, thus forming its own seal against the escape of gas. One of Pauly's workmen, Dreyse, used this cartridge principle for his famous needle-gun, although his first models were muzzle-loaders. In 1839 Dreyse produced a breech-loader, the first bolt-action weapon. Chassepot of France improved on Dreyse's design in 1866, and both the chassepot and needle-gun were used in the Franco-Prussian War. They were superseded by the French Gras rifle in 1874, the true forerunner of the modern infantry rifle. The development of breech-loading artillery followed a similar line, although progress was slower. Again, the introduction of the breech mechanism was aided by the development of better casing for the projectile: the introduction of later shells, for example the type invented by Paixhans, increased the calibre of the guns and made muzzle-loading not only difficult, but also dangerous. The Krupp works at Essen invented a suitable breech device shortly after the Crimean War; this was in the form of a sliding, tapering steel wedge, incorporated into the Krupp 1851 model and employed extensively in the Franco-Prussian War.

Britain, Battle of, July-October 1940 Second World War (Map 13). Hitler needed air supremacy over England as an essential requirement for his proposed invasion, Operation Sealion. The preliminary phase, lasting until 13 August, centred on Luftwaffe attacks on Channel convoys and coastal towns which would be important invasion objectives. The Germans hoped also to draw off RAF Fighter Command strength; Dowding, head of Fighter Command, soon criticized the Admiralty's demand that fighter escorts should be provided for the mass of Channel shipping. RAF casualties mounted and on 26 July discussions between Dowding and the First Sea Lord, Pound, resulted in cessation of merchant ship sailings until better night convoys could be arranged. The heaviest engagement so far took place on 8 August, when a night convoy was detected by the Germans and was attacked by aircraft and E-boats: fighting probably cost the Luftwaffe 31 aircraft to the RAF's 20. The offensive on 13 August, named by Göring as Operation Eagle, was preceded by attacks against RAF radar stations: continuation of these strikes would probably have been more effective for the Germans than the policy now started - a campaign against Fighter Command itself by striking at airfields. Total German air strength for this main phase of the battle numbered about 2,800 aircraft organized into 3 main fleets: Kesselring's Air Fleet Two, based in northern France; Marshal Hugo Sperrle's Fleet Three, operating from Belgium and Holland; and General Hans-Jurgen Stumpff's Fleet Four, based in Norway and consisting mainly of bombers. Fighter Command had a front-line strength of only about 650 aircraft. Respective aircraft chiefly consisted of the German Messerschmitt 109 and the British Spitfire and Hurricane. The Me 109 equalled the Spitfire in fighting performance and was superior to the Hurricane; the latter aircraft, older than the Spitfire, accounted for two-thirds of the RAF's fighters. But the Me 109 could only operate for 90 minutes before having to refuel, thus reducing the time over the target area. The other main German fighter aircraft, the twin-engined Me 110, was unwieldy, while the Stuka dive-bomber was slow in dog-fights and weakly armed. RAF pilots operated near to base, thus enabling a greater number of sorties;



the British also enjoyed the early-warning benefits of radar. Göring intended a combination of bombing and high-level fighter sweeps on 13 August, but thick cloud prevented close liaison between the bombers and fighters: 45 German aircraft were shot down, against the RAF total of 13. Goring tried again on 15 August, this time also using aircraft from Fleet Four in Norway: 75 German aircraft were destroyed compared with the RAF total of 34, with Dowding using his available resources with brilliant efficiency. Another major attack was launched next day, 16 August; Göring seriously underestimated the number of serviceable aircraft left to the RAF, especially at Biggin Hill, Kenley, West Mailing and Croydon. On the 19th Göring told the Luftwaffe: 'We have reached the decisive period of the air war.' On the 20th Churchill declared in the House of Commons: 'Never in the field of human conflict has so much been owed by so many to so few.' These 'few' were dwindling fast: shortages of pilots, rather than aircraft, always caused Dowding most concern. The offensive was resumed on 24 August, mainly against Kent and the south coast: German losses were 40, Fighter Command 20. During the night German bombers struck at south England - and some bombs fell on London for the first time. The battle reached a critical stage at the end of August. Over 1,000 Fighter Command sorties were flown on the 30th, and the battle was maintained at peak intensity on the 31st. By nightfall on the 31st the British had lost about 50 aircraft, compared with the German total of 41. Many Fighter Command bases had been severely damaged, especially Biggin Hill. Air activity dwindled during the next few days. Then, 7 September, the Germans launched a massive bomber and fighter raid totalling nearly 1,000 aircraft: of these about 250 bombers managed to reach London. The Blitz had begun, aimed at British cities. By conceding defeat in the attempt to eliminate Fighter Command, Hitler's chances of achieving air supremacy over southern England were reduced. On the 15th Kesselring used all his available aircraft in an assault on London, while Sperrle sent a diversionary force against Portsmouth. Once again Dowding deployed his resources with extreme skill. At times during this day almost all Fighter Command squadrons were committed, but by nightfall the Luftwaffe had suffered about 60 losses, compared with an RAF total of 25 aircraft with 13 pilots killed or missing. The RAF had retained air supremacy. The Blitz would continue, but the Battle of Britain had been won; on 12 October Hitler called off his invasion preparations. Total losses during the battle were about 1,733 German aircraft destroyed and 915 British. Britain owed her success in the battle to three main factors: first, the inadequacy of the Luftwaffe to perform the role thrust upon it; second, the skill and tenacity of RAF Fighter Command; third, and perhaps most important, the astonishing replacement rate of RAF aircraft. With the first, the Luftwaffe had been designed primarily for a close support role in conjunction with ground forces: both training and aircraft had not been directed towards the strategic, front-line task involved with the Battle of Britain. With the second, Dowding directed his resources with admirable dexterity, and RAF pilots themselves learnt from earlier mistakes - notably the folly of being lured too far out to sea. With the third, replacement figures, post-war statistics reveal that the RAF Fighter Command was in fact farther from defeat at the climax of the Battle of Britain than it had been after the fall of Dunkirk. On 3 June, 1940, Fighter Command operational strength stood at 79 Blenheims, 162 Spitfires, 163 Hurricanes and 9 Defiants, giving a total of 413; on 1 August, just before the most active period of the battle, these figures had risen respectively to 63, 329, 348, 25, a total of 675. Despite subsequent losses in the intense aerial struggle by 20 September the figures still stood at 55, 237, 391, 31, a total of 704. RAF Fighter Command therefore had almost 300 aircraft more after the battle than at the time of Dunkirk, largely due to the incredible efforts in the production factories under Lord Beaverbrook's leadership. Pilot losses always caused anxiety, yet these also can be exaggerated. More men were killed and wounded on average

each day during the battle for

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## **Book Information**

Language: English

File size: 7781 KB

Simultaneous device usage: Up to 4 simultaneous devices, per publisher limits

Text-to-Speech: Enabled

Enhanced typesetting: Enabled

X-Ray: Not Enabled

Word Wise: Not Enabled

Print length: 529 pages

Lending: Not Enabled

Screen Reader: Supported

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