INDIAN SWORDS

DURING THE LATE 18th and early 19th centuries, the British East India Company extended its control over most of India, paving the way for the establishment of the British Raj. These political changes had limited impact upon Indian swordsmiths, who continued to produce swords in a great diversity of forms. These included not only mainstream swords in the Muslim and Hindu traditions, chiefly forms of *talwar* and *khanda*, made for the Indian princely courts that survived under British suzerainty, but also many regional or tribal variants—some distinctly strange to Western eyes. British officers often took swords home with them as souvenirs, many of which have ended up in museums.

KHANDA

Influenced by the Hindu Maratha culture, this *khanda* has a straight, watered-steel blade that widens toward the tip. As is common in *khandas* of this period, the light, elastic blade is stiffened by reinforcements that run two-thirds of the length of one edge and a short way up the other.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	2¾ LB (1.3 KG)
LENGTH	39 IN (99.3 CM)

FULL VIEW

VECHEVORAL

The Indian subcontinent abounded in varieties of cutting implements for warfare and general agricultural use. This ornate *vechevoral* has a handle of wood and ivory, and a sickle-shaped blade with a concave cutting edge and a band of brass and decorative scrolling along the back.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	2¾ LB (1.3 KG)
LENGTH	24½ IN (62.1 CM)

TALWAR

The blade inscription of this *talwar* suggests that it was made for one of the Nizams of Hyderabad, Muslim princes who ruled part of northern India from 1724 to 1948. The blade is unadorned; the hilt has fine traditional Indo-Muslim decoration.

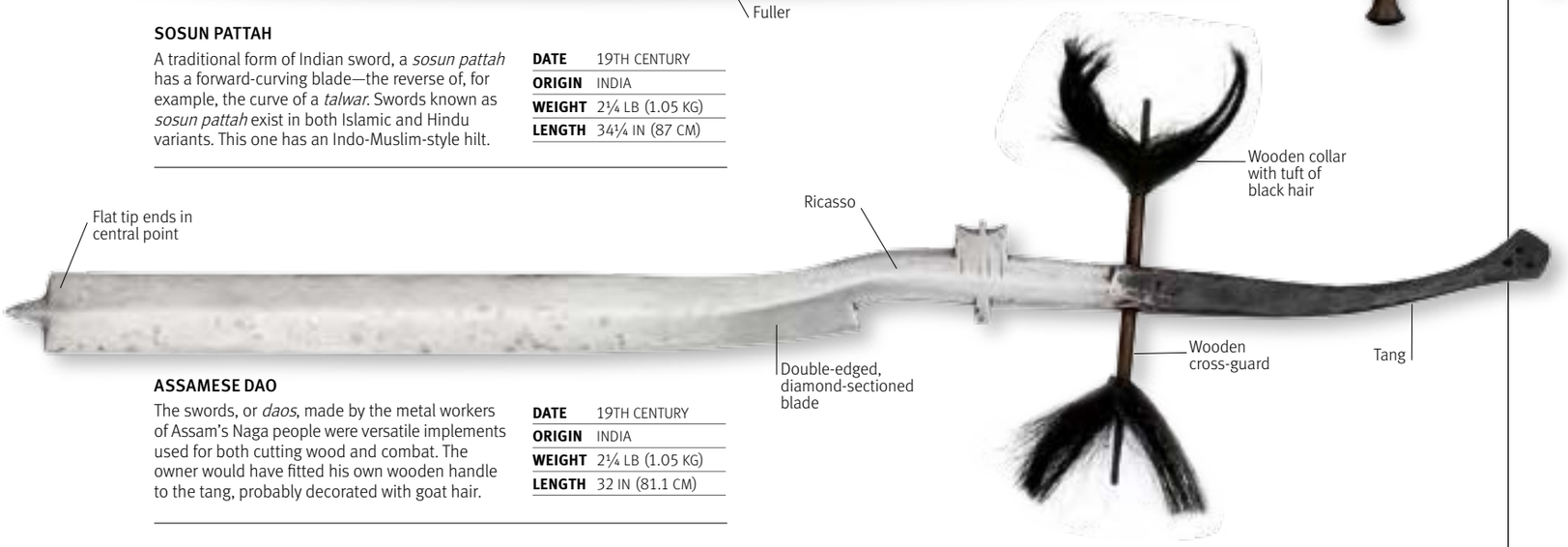
DATE	18TH CENTURY
ORIGIN	INDIA
WEIGHT	2½ LB (1.1 KG)
LENGTH	37¼ IN (94.9 CM)

HILT DETAIL
The iron hilt is exquisitely decorated with gold *koftgari* overlay, with leaf-fronds arranged in a scalelike pattern. The grip is lozenge-shaped in cross-section and made of a single piece with the quillons and langets; a dish pommel and knucklebow are attached.

SOSUN PATTAH

A traditional form of Indian sword, a *sosun pattah* has a forward-curving blade—the reverse of, for example, the curve of a *talwar*. Swords known as *sosun pattah* exist in both Islamic and Hindu variants. This one has an Indo-Muslim-style hilt.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	2¼ LB (1.05 KG)
LENGTH	34¼ IN (87 CM)



ASSAMESE DAO

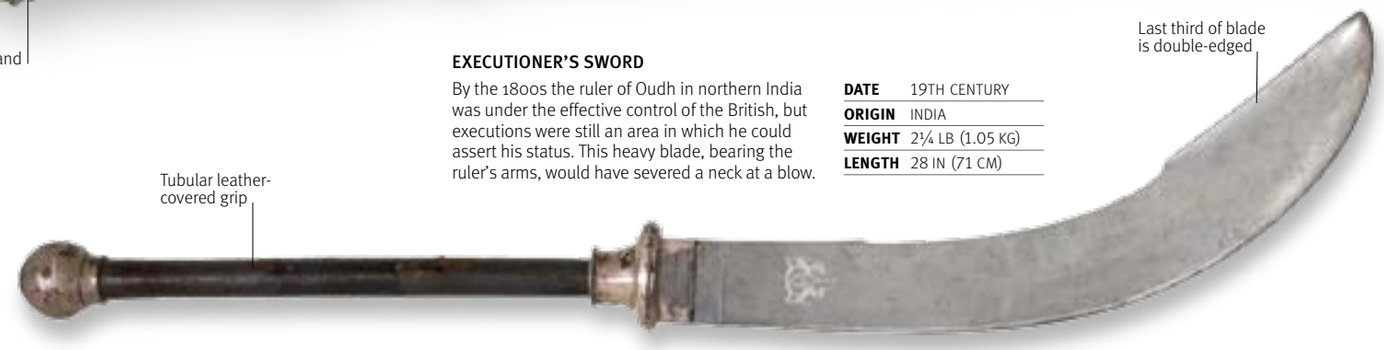
The swords, or *daos*, made by the metal workers of Assam's Naga people were versatile implements used for both cutting wood and combat. The owner would have fitted his own wooden handle to the tang, probably decorated with goat hair.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	2¼ LB (1.05 KG)
LENGTH	32 IN (81.1 CM)

EXECUTIONER'S SWORD

By the 1800s the ruler of Oudh in northern India was under the effective control of the British, but executions were still an area in which he could assert his status. This heavy blade, bearing the ruler's arms, would have severed a neck at a blow.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	2¼ LB (1.05 KG)
LENGTH	28 IN (71 CM)



INDIAN AND NEPALESE DAGGERS

THE INDIAN SUBCONTINENT is the source of some of the world's most effective and original melee weapons. These include a range of fearsome sharp-pointed knives with double-curved blades and various forms of fist dagger, which allowed the user to deliver a stabbing blow to an enemy with a punching movement. Parrying sticks were a feature that Indian armies had in common with African tribal forces. Nepal made its contribution with the very effective *kukri*, an implement with many practical non-military uses, as well its role as the weapon carried by all Nepalese Gurkhas.

INDIAN DOUBLE-EDGED KNIFE

Made in Vijayanagar, this knife has a typically sinuous Indian blade. The hilt is skilfully shaped to fit the hand and fingers, giving a firm and comfortable grip. The blade thickens into a diamond shape behind the tapering point.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	1¾ LB (0.83 KG)
LENGTH	20 IN (51 CM)

NEPALESE KUKRI

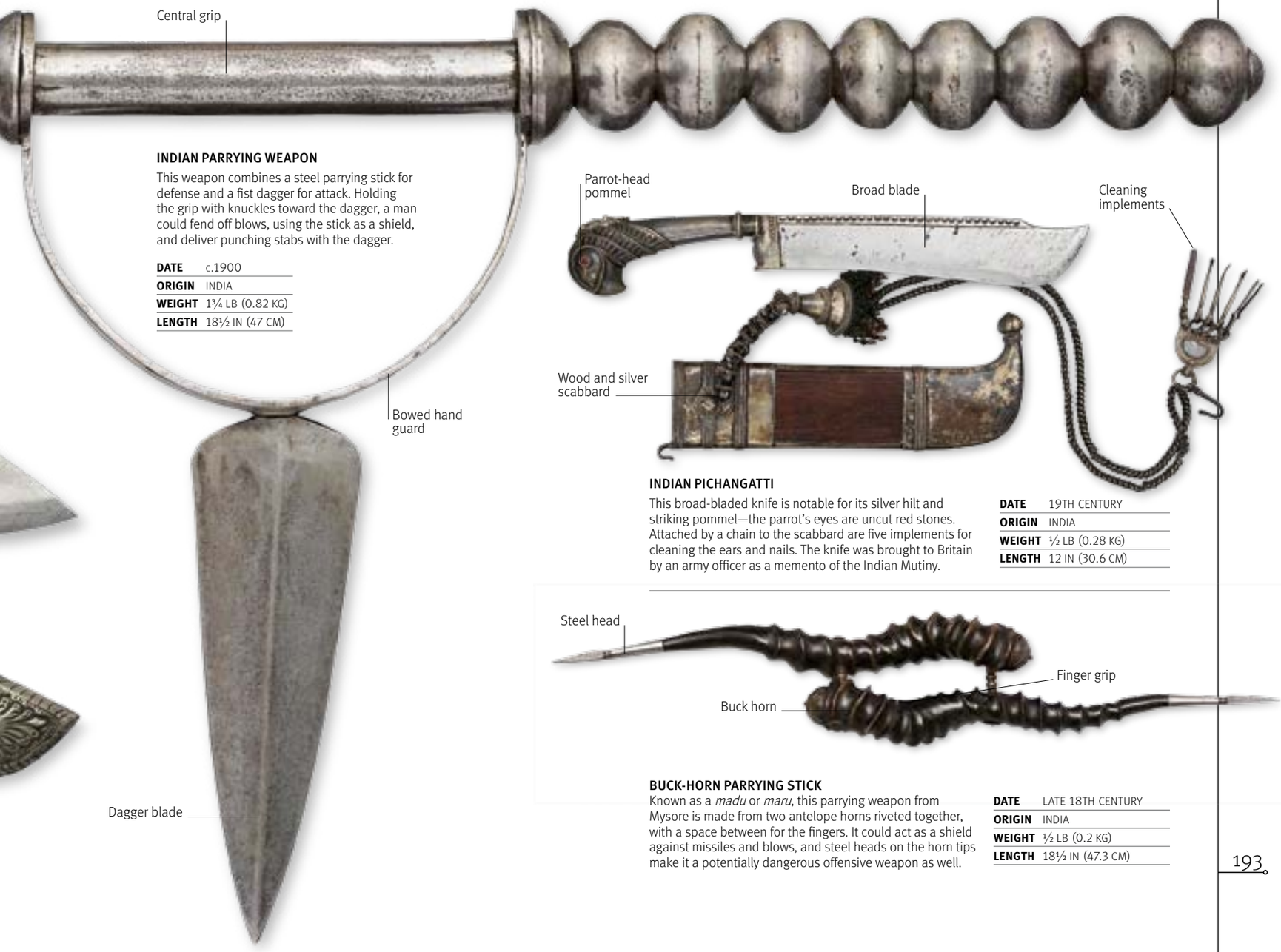
With its wooden handle, broad, angled blade, and notch or *cho*, this is a typical example of the Nepalese Gurkhas' *kukri*. The *cho* has religious significance as the symbol of the destructive Hindu god Shiva. The quality of the sheath suggests this was the property of a wealthy man.

DATE	c.1900
ORIGIN	NEPAL
WEIGHT	1 LB (0.48 KG)
LENGTH	17½ IN (44.5 CM)

INDIAN BICH'HWA

The name of this dagger derives from *bichwa*—a scorpion—whose deadly sting the blade is presumed to resemble. The four *bagh nakh* or tiger's claws, attached to the steel rings on the handle, offer an alternative mode of attack.

DATE	c.1900
ORIGIN	INDIA
WEIGHT	½ LB (0.3 KG)
LENGTH	12 IN (30.5 CM)



INDIAN PARRYING WEAPON

This weapon combines a steel parrying stick for defense and a fist dagger for attack. Holding the grip with knuckles toward the dagger, a man could fend off blows, using the stick as a shield, and deliver punching stabs with the dagger.

DATE	c.1900
ORIGIN	INDIA
WEIGHT	1¾ LB (0.82 KG)
LENGTH	18½ IN (47 CM)

INDIAN PICHANGATTI

This broad-bladed knife is notable for its silver hilt and striking pommel—the parrot's eyes are uncut red stones. Attached by a chain to the scabbard are five implements for cleaning the ears and nails. The knife was brought to Britain by an army officer as a memento of the Indian Mutiny.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	½ LB (0.28 KG)
LENGTH	12 IN (30.6 CM)

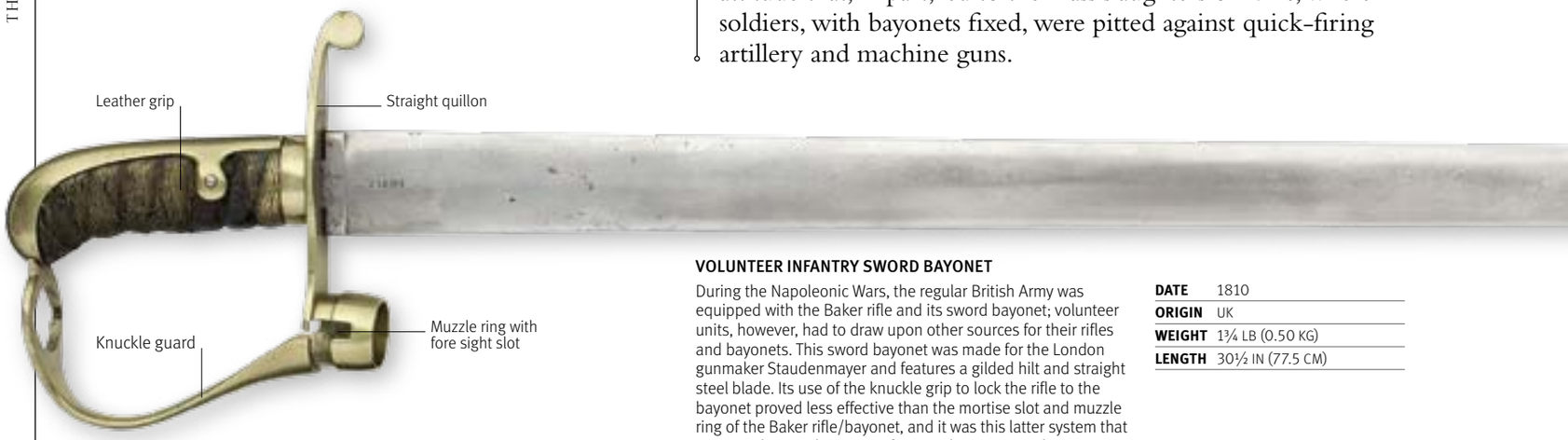
BUCK-HORN PARRYING STICK

Known as a *madu* or *maru*, this parrying weapon from Mysore is made from two antelope horns riveted together, with a space between for the fingers. It could act as a shield against missiles and blows, and steel heads on the horn tips make it a potentially dangerous offensive weapon as well.

DATE	LATE 18TH CENTURY
ORIGIN	INDIA
WEIGHT	½ LB (0.2 KG)
LENGTH	18½ IN (47.3 CM)

EUROPEAN AND AMERICAN BAYONETS

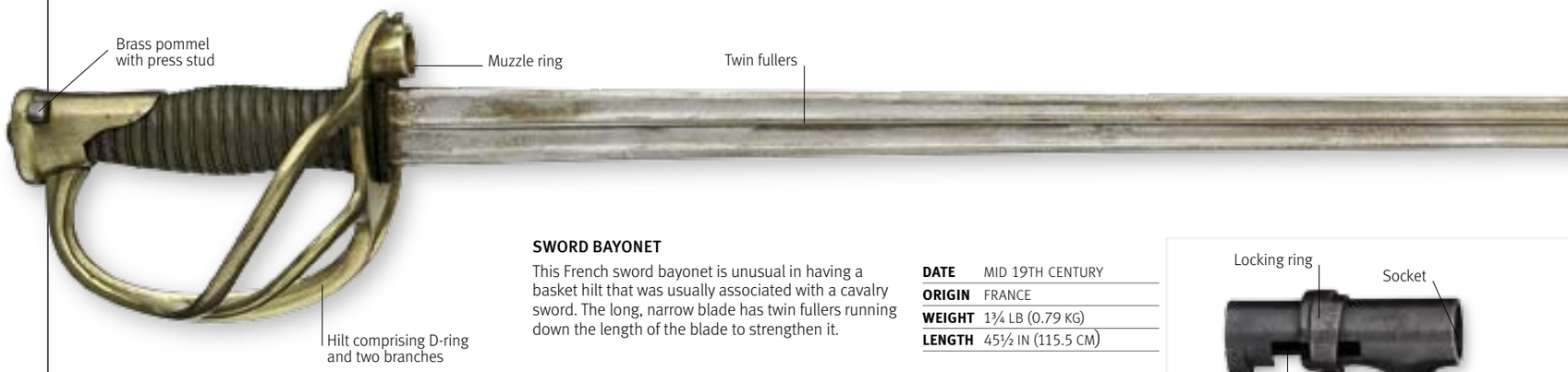
THE SWORD BAYONET with its long blade, became increasingly popular in the 19th century, replacing the hanger sword and socket bayonet of the ordinary infantryman. But the 19th century also saw the development of mass-produced, long-range firepower that rendered the bayonet irrelevant as a military weapon. Despite this, armies continued to place great emphasis on the bayonet, not least because it was believed to encourage an aggressive, offensive spirit among the infantry. It was this attitude that, in part, led to the mass slaughters of 1914, where soldiers, with bayonets fixed, were pitted against quick-firing artillery and machine guns.



VOLUNTEER INFANTRY SWORD BAYONET

During the Napoleonic Wars, the regular British Army was equipped with the Baker rifle and its sword bayonet; volunteer units, however, had to draw upon other sources for their rifles and bayonets. This sword bayonet was made for the London gunmaker Staudenmayer and features a gilded hilt and straight steel blade. Its use of the knuckle grip to lock the rifle to the bayonet proved less effective than the mortise slot and muzzle ring of the Baker rifle/bayonet, and it was this latter system that continued to set the pattern for most bayonet attachments.

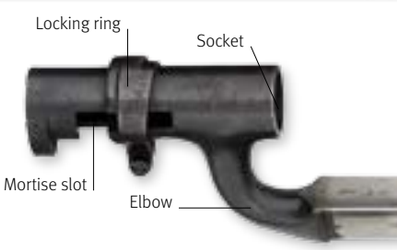
DATE	1810
ORIGIN	UK
WEIGHT	1¾ LB (0.50 KG)
LENGTH	30½ IN (77.5 CM)



SWORD BAYONET

This French sword bayonet is unusual in having a basket hilt that was usually associated with a cavalry sword. The long, narrow blade has twin fullers running down the length of the blade to strengthen it.

DATE	MID 19TH CENTURY
ORIGIN	FRANCE
WEIGHT	1¾ LB (0.79 KG)
LENGTH	45½ IN (115.5 CM)



CHASSEPOT BAYONET

This bayonet was designed for the famous Chassepot breech-loading rifle that armed the French during the Franco-Prussian War of 1870–71, and which continued in service until the arrival of the 1874 model. The distinctive "Yataghan" recurved blade influenced designs throughout Europe and the United States.

DATE	1866–74
ORIGIN	FRANCE
WEIGHT	1¾ LB (0.76 KG)
LENGTH	27½ IN (70 CM)

BAYONET CHARGE
Prussian troops (left) attack French lines during a battle in the Napoleonic Wars, August 27, 1813. The bayonet charge was much beloved of military painters of the 19th century, although they were rare occurrences in practice.

ELCHO BAYONET

While the Martini-Henry rifle was undergoing acceptance trials for the British Army, Lord Elcho, in a private initiative, submitted this bayonet to go with the firearm. Elcho extended the bayonet's range of tasks to include those of hacking down brush and sawing wood.

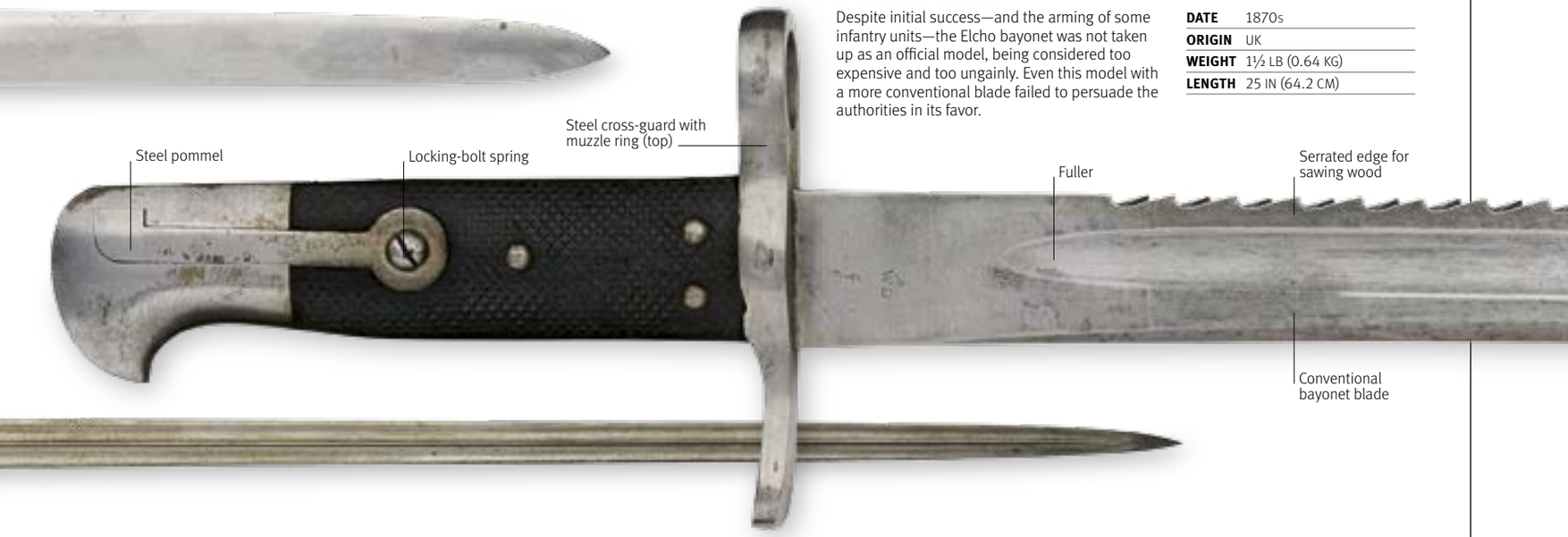
DATE	1870s
ORIGIN	UK
WEIGHT	1½ LB (0.65 KG)
LENGTH	25 IN (64 CM)

FULL VIEW

LATER ELCHO BAYONET

Despite initial success—and the arming of some infantry units—the Elcho bayonet was not taken up as an official model, being considered too expensive and too ungainly. Even this model with a more conventional blade failed to persuade the authorities in its favor.

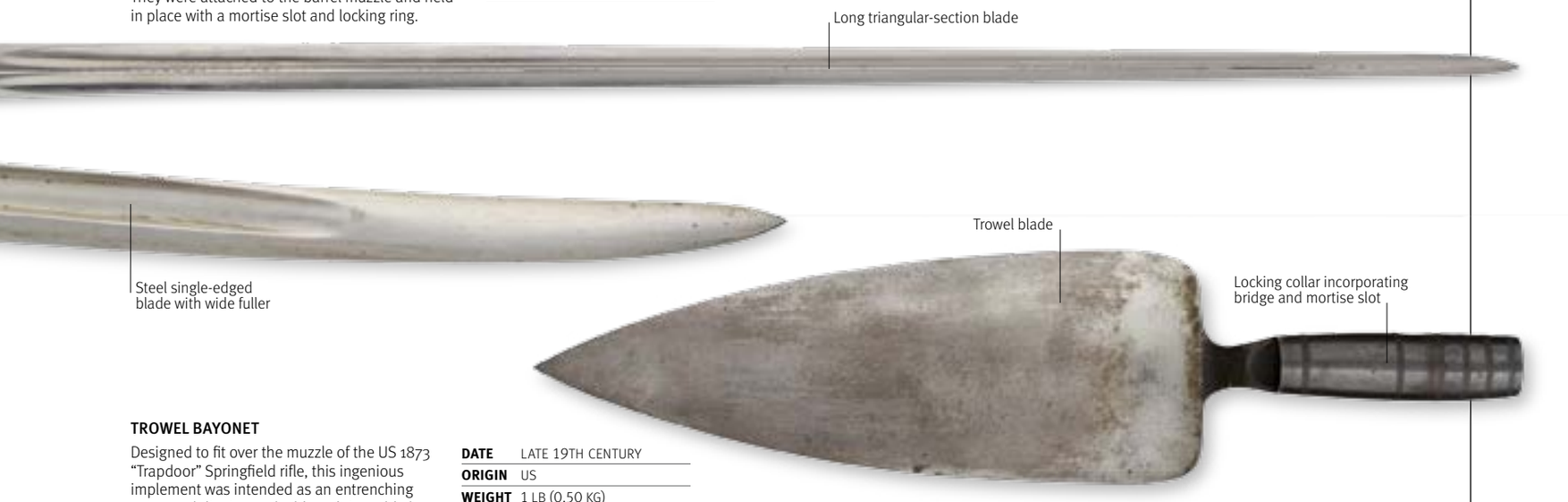
DATE	1870s
ORIGIN	UK
WEIGHT	1½ LB (0.64 KG)
LENGTH	25 IN (64.2 CM)



MARTINI-HENRY SOCKET BAYONET

Lighter, cheaper, and as efficient as a sword bayonet, socket bayonets were issued for use with the Martini-Henry rifle (although senior NCOs were allowed their more prestigious sword bayonets). They were attached to the barrel muzzle and held in place with a mortise slot and locking ring.

DATE	c.1876
ORIGIN	UK
WEIGHT	1 LB (0.45 KG)
LENGTH	25¼ IN (64 CM)



TROWEL BAYONET

Designed to fit over the muzzle of the US 1873 "Trapdoor" Springfield rifle, this ingenious implement was intended as an entrenching or general digging tool, although it could also be used as a very broad-bladed bayonet. Constructed from metal, it has a blued finish.

DATE	LATE 19TH CENTURY
ORIGIN	US
WEIGHT	1 LB (0.50 KG)
LENGTH	14½ IN (36.8 CM)

INDIAN STAFF WEAPONS

THE DOMINATION OF INDIA by British forces in the late 18th and 19th centuries, armed at first with muskets and later with rifles, rendered staff weapons increasingly obsolete on the subcontinent. To be effective, Indian armies had to deploy artillery and firearms. Traditional varieties of battle-ax and mace continued to be found in the armouries of Hindu and Muslim princes, and among the weaponry of tribal peoples. Many of these weapons were more ceremonial than practical, their elaborate decoration being an indicator of their owner's wealth and status. They also proved attractive to European collectors of exotic weaponry.

ANKUS

This *ankus*, or elephant goad, is of traditional form, with the spike and hook designed for controling the animal by pressure on the hide. The goad is so splendidly decorated, however, that it was probably intended for display rather than for practical use, being carried in a similar manner to a ceremonial mace.

DATE	MID-19TH CENTURY
ORIGIN	INDIA
WEIGHT	1¼LB (0.59KG)
LENGTH	14½IN (37CM)

BHUJ

The knife-like battle-ax known as a *bhuj* was used from earliest times in tribal India and adopted by Hindu and Muslim armies. It is often called an "elephant's head" because of the characteristic decoration between shaft and blade.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	2LB (0.87KG)
LENGTH	27¾IN (70.4CM)

TWO-POINTED TONGI

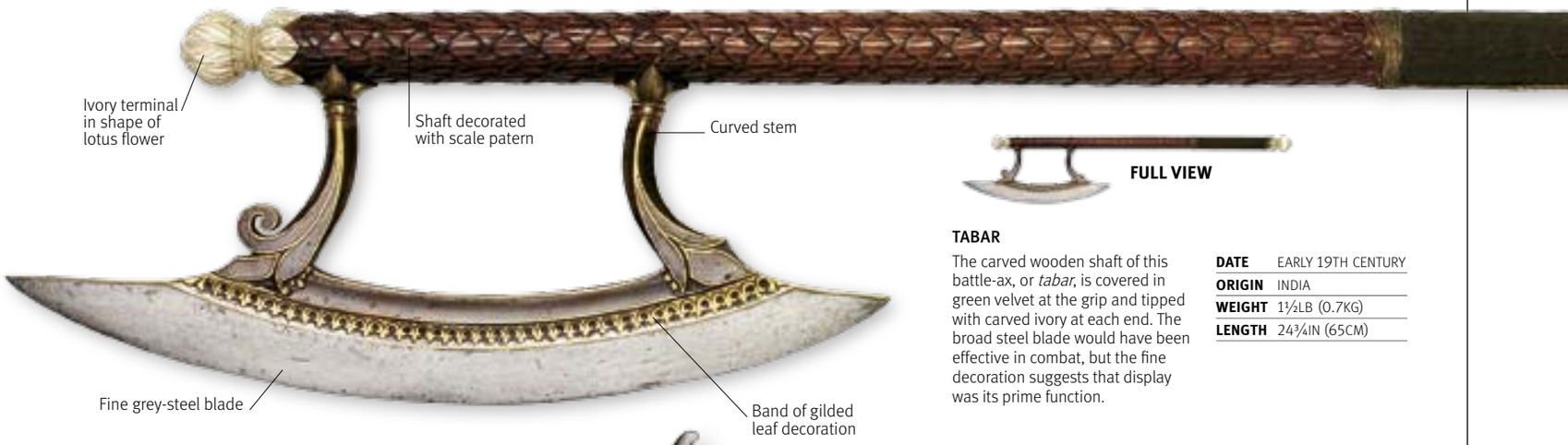
The two-pointed steel head of this ax, or *tongi*, bears traces of punched decorations but is otherwise unadorned. The nature of the head reflects an abiding Indian attraction toward elaborately shaped weaponry.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	1½LB(0.7KG)
LENGTH	33½IN (85CM)

FOUR-POINTED TONGI

Broadly similar to the two-pointed axe above, this *tongi* has a steel head that diverges into four points. This is a basic and functional weapon, possibly used by a member of the Dravidian Khond tribes.

DATE	19TH CENTURY
ORIGIN	INDIA
WEIGHT	0.5KG (1LB)
LENGTH	95CM (37½IN)



FULL VIEW

TABAR

The carved wooden shaft of this battle-ax, or *tabar*, is covered in green velvet at the grip and tipped with carved ivory at each end. The broad steel blade would have been effective in combat, but the fine decoration suggests that display was its prime function.

DATE	EARLY 19TH CENTURY
ORIGIN	INDIA
WEIGHT	1½LB (0.7KG)
LENGTH	24¾IN (65CM)

SPIKED MACE

Bearing 118 individual spikes, this mace would have delivered a devastating blow to an opponent. This particular mace is a Maratha weapon. The Marathas' greatest triumph was the victory over the forces of the British East India Company at Wadgaon in 1779.

DATE	18TH CENTURY
ORIGIN	INDIA
WEIGHT	5¾LB (2.66KG)
LENGTH	30¼IN (76.9CM)

FULL VIEW

AFRICAN EDGED WEAPONS

AT THE END OF THE 18TH CENTURY Europeans were an influence only at the coastal margins of Africa. African states and tribal societies carried on traditional forms of warfare, despite the presence of imported firearms. By 1900 European colonial powers had carved up the continent between them, but even then most Africans were still largely unaffected by European ideas and technology. Traditional forms of weaponry were being made well into the 20th century, with African metalworkers displaying their skills in the forging of blades and heads for missile weapons.

RIVAL TRIBES IN ETHIOPIA
This European engraver's impression of tribes at war in southern Ethiopia was not based on any first-hand knowledge of their weaponry or fighting techniques. The sword has the look of an Islamic scimitar.

CONGOLESE AX
This is a ceremonial ax of a kind often carried by chiefs of the Songye people of southeastern Congo. The axes were made by the Nsapo subgroup, who were skilled at working iron and copper.

DATE	c.1900
ORIGIN	DEM. REP. OF CONGO
WEIGHT	3 LB (1.35 KG)
LENGTH	16¾ IN (42.8 CM)

FIGHTING PICK

This unusual fighting pick from West Africa has a barbed metal point with a tang inserted into a wooden shaft. The roughened skin of a monitor lizard has been used to improve the grip on the handle.

DATE	c. 1900
ORIGIN	GHANA
WEIGHT	1½ LB (0.65 KG)
LENGTH	20 IN (51 CM)

SUDANESE ARROWS

Tribal warfare in Sudan consisted of rushing forward to discharge arrows at the enemy from some 165 ft (50 m) range, then retreating to avoid arrows fired in reply. The multiple barbs on the arrowheads made them very difficult to extract from a wound.

	TOP: c.1900	BOTTOM: c.1900
DATE	TOP: c.1900	BOTTOM: c.1900
ORIGIN	SUDAN	SUDAN
WEIGHT	1 OZ (28 G)	1 OZ (28 G)
LENGTH	24 IN (61 CM)	26 IN (66 CM)

AFRICAN SPEARS

In tribal warfare, spears were almost always used as missile weapons, thrown in skirmishes where warriors avoided close combat. They might serve to finish off enemies wounded by arrows and unable to flee.

	TOP: c.1900	BOTTOM: c.1900
DATE	TOP: c.1900	BOTTOM: c.1900
ORIGIN	SUDAN	AFRICA
WEIGHT	2½ LB (1.15 KG)	1 LB (0.45 KG)
LENGTH	105 IN (267 CM)	48 IN (122 CM)

AX CLUB

This decorative, highly-polished ax club was probably made in the West African kingdom of Dahomey. The weapon's metal blade is blunt, perhaps because it was for ceremonial use. A powerful slave-trading state during the 18th and 19th centuries, Dahomey was conquered by France in the 1890s.

DATE	c.1900
ORIGIN	DAHOMEY
WEIGHT	¾ LB (0.39 KG)
LENGTH	17¾ IN (45 CM)

BROAD-BLADED STABBING SPEAR

ZULU WARRIOR

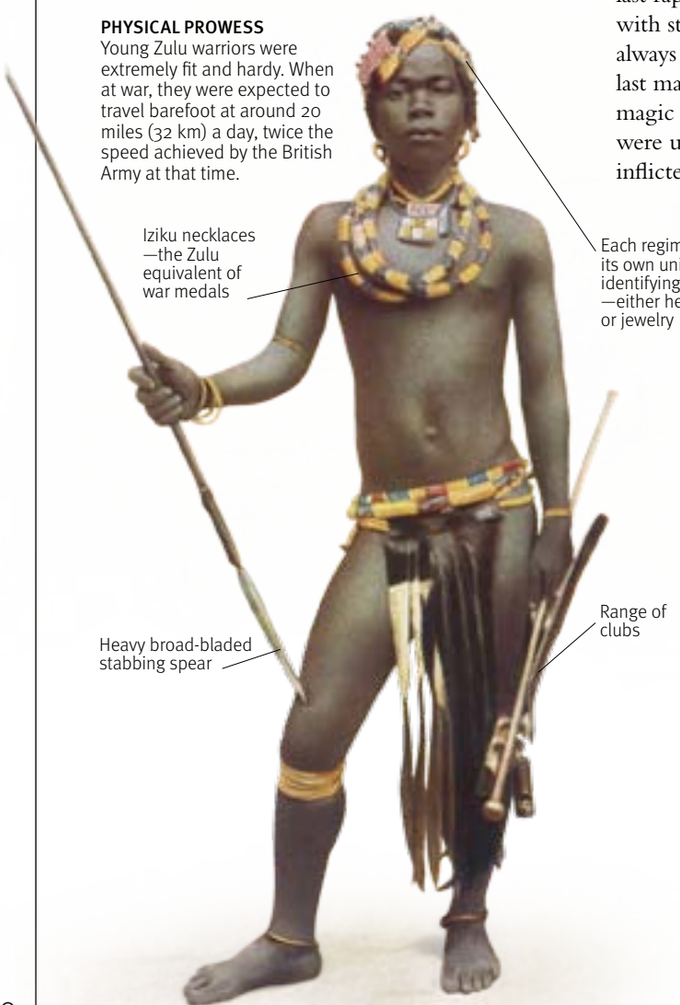
THE ZULU OF SOUTHERN AFRICA, were transformed into a formidable military force under paramount chief Shaka from 1816 to 1828. Victories over neighboring peoples created an extensive Zulu empire that came into conflict with European settlers. Defeat by the British in 1879 brought Zulu ascendancy to an end, but not before allowing the Zulu warriors to display their fighting qualities against a modern European army.

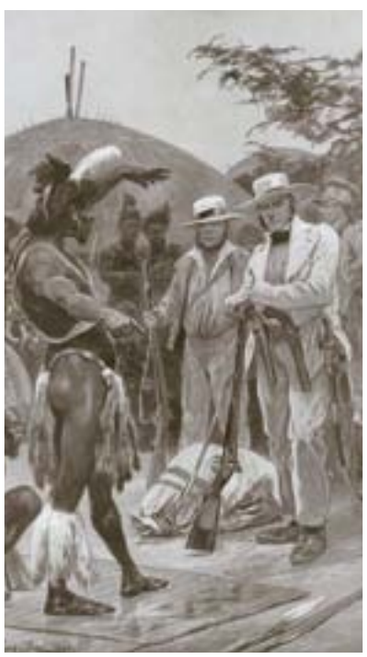
DISCIPLINED FIGHTERS

The Zulu military system was based on the close bonding of unmarried men grouped by age. Brought together in a barracks when around 18 to 20 years old, they developed a strong identity as a "regiment" marked by a distinctive color of shield and details of ceremonial furs and feathers. They remained in service until the age of 40, when they were allowed to retire and marry. The Zulu warrior's main equipment was the heavy stabbing spear and large cowhide shield. Zulu also carried throwing spears, clubs, and latterly firearms—although these they used poorly.

Moving barefoot across country without supplies, foraging for food, their army was preceded by scouts and skirmishers who provided intelligence and masked their movements. Their attack formation consisted of an encircling movement from both flanks—the "horns"—a "chest" directly confronting the enemy center, and a reserve force in the rear, the "loins." Warriors advanced toward the enemy in loose order at a steady jog, taking full advantage of any cover. Once within range, they would loose their throwing spears or a volley from their firearms and then make a last rapid dash upon the enemy position, armed with stabbing spear and shield. If successful, they always sought to slaughter their enemy to the last man, taking no prisoners. Despite the use of magic potions to guarantee their safety, the Zulu were unable for long to sustain the heavy losses inflicted by British breech-loading rifles.

PHYSICAL PROWESS
Young Zulu warriors were extremely fit and hardy. When at war, they were expected to travel barefoot at around 20 miles (32 km) a day, twice the speed achieved by the British Army at that time.





BRITISH OFFICERS MEETING WITH CHIEFS UNDER SHAKA IN 1824

SHAKA

Paramount chief Shaka (1787–1828) transformed Zulu warriors into a potent military machine. Before his day, warfare was conducted through the largely ineffectual use of throwing spears and ritual combat between individual warriors. Shaka initiated war to the death. In ten years, through a series of exterminatory campaigns known as the *mfecane* ("crushing"), he created a large empire, killing possibly as many as 2 million in the process. His cruelty was also turned upon his own people, with thousands killed in mass executions. Shaka was assassinated by his half-brothers in 1828, but the empire he had created lasted another half century.

DRESSED TO KILL
A Zulu warrior's war dress was a stripped-down version of the full regalia worn for tribal ceremonies, but could still make elaborate use of cow's tails and feathers. This warrior carries a selection of throwing spears as well as his principal weapon, the large-bladed stabbing spear.

BATTLE OF ISANDHLWANA
The Zulus' most impressive victory over the British occurred at Isandhlwana in January 1879. The British force, over 1,600 strong, was overtaken by a surprise Zulu attack at 8 a.m., although the Zulu also suffered heavy losses. Six whole companies of the British 24th Foot Regiment totaling 602 men, later known as the South Wales Borderers, were wiped out to a man.

"WE KILLED EVERY WHITE MAN LEFT IN THE CAMP AND THE HORSES AND CATTLE TOO."

ZULU WARRIOR GUMPEGA KWABE ON MASSACRE OF BRITISH AT NTOMBE RIVER, MARCH 1879

TOOLS OF COMBAT

COWHIDE SHIELD

DECORATED CLUB

STABBING SPEAR

OCEANIAN CLUBS AND DAGGERS

THE POLYNESIANS AND other peoples who occupied the islands of the Pacific before the arrival of Europeans in the 17th century, were much given to warfare. They engaged in forms of combat ranging from revenge raids and ritualized skirmishing, to wars of conquest and extermination. Their weaponry was limited, consisting largely of wooden clubs, cleavers, daggers, and spears, sometimes edged with sharpened bone, shell, coral, stone, or obsidian. Weapons were intricately decorated, and often held as objects of religious significance and valued as heirlooms.

TONGAN CLUB

This heavy club from Tonga is carved along its length with geometric patterns, human figures, animals, and fish. Holding the handle with both hands, a warrior could bring the diamond-shaped head down on an enemy's skull in a crushing blow. The sharp corners would have been very effective on focusing the mass of the weapon at its point of impact.

DATE	19TH CENTURY
ORIGIN	TONGA
WEIGHT	2¾ LB (1.3 KG)
LENGTH	32¼ IN (82 CM)

FULL VIEW

MELANESIAN CLUB

This highly polished wooden club comes from one of the islands of Vanuatu. It has a stylized human face carved on each side of the head, a form of decoration that is quite frequently found on clubs in various parts of Oceania. The eyes are picked out with red beads and white shells. The club's cylindrical handle, ending in a circular butt, is quite long, but overall the club is relatively light in weight.

DATE	19TH CENTURY
ORIGIN	VANUATU
WEIGHT	1¼ LB (0.6 KG)
LENGTH	32 IN (82 CM)

FULL VIEW

POLYNESIAN "CUTLASS"

The shape of this weapon, either a club or a cleaver, is most unusual, perhaps modeled on the cutlasses that were carried by European sailors. The Polynesian craftsman has blended that exotic shape with intricate indigenous carving—triangular sections and geometric motifs—that covers the head of the weapon.

DATE	19TH CENTURY
ORIGIN	POLYNESIA
WEIGHT	3¼ LB (1.5 KG)
LENGTH	30½ IN (77.5 CM)

DAGGER WITH OBSIDIAN BLADE

This dagger is from the Admiralty Islands, off New Guinea, where the volcanic glass obsidian occurs naturally. The Melanesians discovered how to flake obsidian to a razor-sharp edge. The blade of this dagger is flat on one side and raised to a ridge on the other. The pointed wooden handle is decorated with designs characteristic of this region.

DATE	c.1900
ORIGIN	PAPUA NEW GUINEA
WEIGHT	2 OZ (60 G)
LENGTH	11 IN (28 CM)

OBSIDIAN SPEARHEAD

Like the dagger above, this spear was made by the Melanesian people of the Admiralty Islands. The obsidian has been flaked to make a spearhead with sharp edges and a point. The head is flat on one side and ridged on the other. Only part of the ocher-painted, decorated wooden shaft remains. It is fixed to the obsidian head with resin.

DATE	c.1900
ORIGIN	PAPUA NEW GUINEA
WEIGHT	½ LB (0.22 KG)
LENGTH	15 IN (38 CM)

MAORI PATUKI

The Maori, Polynesians who colonized New Zealand around 1000 BCE, were among the most warlike of Pacific peoples. This two-edged club, known as a *patuki*, comes from New Zealand's North Island and may have been taken as plunder by the British after their victory in the Maori War of 1860–69. It is decorated with iridescent haliotis shells, as well as elaborate carvings.

DATE	c.1860
ORIGIN	NEW ZEALAND
WEIGHT	¾ LB (0.31 KG)
LENGTH	14½ IN (37 CM)

NORTH AMERICAN KNIVES AND CLUBS

ALTHOUGH WOOD AND stone implements remained in use, by the late 18th century Native Americans were employing edged weapons with metal blades or heads. They were major purchasers of European and Euro-American manufactured edged tools and weapons, which they often customized with decorative motifs. Most of the items shown here were not primarily designed for combat, having a range of practical or symbolic uses.

KNIFE AND RAWHIDE SHEATH

This knife was constructed by attaching a wooden handle to the head of a lance or spear—a common weapon for a Native American warrior. The rawhide sheath, finely stitched with beadwork, was probably used with this knife, but not specifically made for it, hence the difference in shape.

DATE	c.1900
ORIGIN	US
WEIGHT	½ LB (0.3 KG)
LENGTH	16 IN (41 CM)

TRADE KNIFE AND SHEATH

Many thousands of European-made knives were traded with Native Americans, mostly in exchange for furs. This iron blade, attached to a shaped handle, was a far more effective tool than traditional stone implements. The deerskin sheath has been stitched using softened and dyed porcupine quills. The decorative tassels hang on one side of the sheath only, indicating that it would have been worn on the left side of the body.

DATE	19TH CENTURY
ORIGIN	US
WEIGHT	1¼ LB (0.56 KG)
LENGTH	15 IN (38 CM)

TLINGIT FIGHTING KNIFE

The Tlingit people of the northwest Pacific coast were skilled metalworkers, producing good-quality copper and iron blades. The handle of this knife is wrapped in leather and topped with a fine totem carving, which is inlaid with abalone shell. Fighting in close combat, the Tlingit warrior would wrap the loose leather strap around his wrist to ensure a secure hold upon the weapon.

DATE	19TH CENTURY
ORIGIN	US
WEIGHT	1 LB (0.5 KG)
LENGTH	19½ IN (50 CM)

HAIDA CLUB

Living on islands off the northwest coast of North America, the Haida people fished from canoes. This wooden club, showing a stylized fish, would have been used in halibut fishing. Halibut weighing around 400 lb (180 kg) were caught by setting hooks close to the ocean bed. Once hauled to the surface, they had to be stunned immediately with clubs, before their struggles upset the canoe.

DATE 19TH CENTURY
ORIGIN US

PIPE TOMAHAWK

The idea of combining a peace pipe and a war axe was dreamed up by Euro-American traders, but taken on by Native Americans with enthusiasm. They bought large numbers, making them a part of their culture. Pipe tomahawks were carried by Native American chiefs as symbols of prestige, and exchanged as diplomatic gifts.

DATE c.1890
ORIGIN US

PENOBSCOT STONE CLUB

The Penobscot Indian nation lives in Maine. Speaking an Algonquin language, they sided with the American rebels against the British and the Algonquins' traditional enemies, the Iroquois, in the Revolutionary War of 1775–83. This stone club would typically have been used to finish off a wounded moose or deer, which had been brought down by an arrow or spear.

DATE 19TH CENTURY
ORIGIN US

LITTLE BIGHORN
Both bows and arrows and firearms (traded with the English) were used by the Native Americans in battle. Amos Bad Heart Buffalo (1869–1913), the artist who painted this picture, was a Native American warrior who joined the US army and made over 400 illustrations of his people.

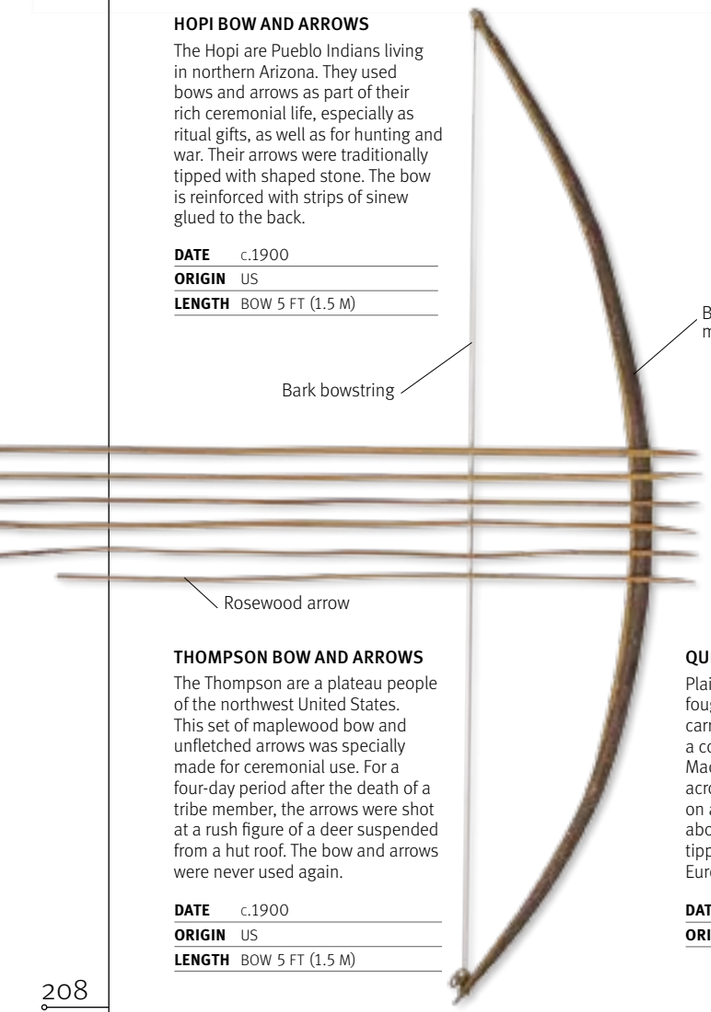
NORTH AMERICAN HUNTING BOWS

BOWS WERE AMONG the most important weapons of the native peoples of North America, for hunting, warfare, and ceremonial use. They were "backed bows"—simple bows reinforced with sinew on the side facing away from the archer. The basic material was wood, although in some parts, horn or bone predominated. Arrows often had detachable foreshafts, which would stay embedded in the prey when the hunter pulled the shaft away. Unlike the longbowmen of Agincourt, who drew their bows with fingers on either side of the arrow, skilled North American Indian hunters used two fingers beneath the arrow to pull the string.

HOPI BOW AND ARROWS

The Hopi are Pueblo Indians living in northern Arizona. They used bows and arrows as part of their rich ceremonial life, especially as ritual gifts, as well as for hunting and war. Their arrows were traditionally tipped with shaped stone. The bow is reinforced with strips of sinew glued to the back.

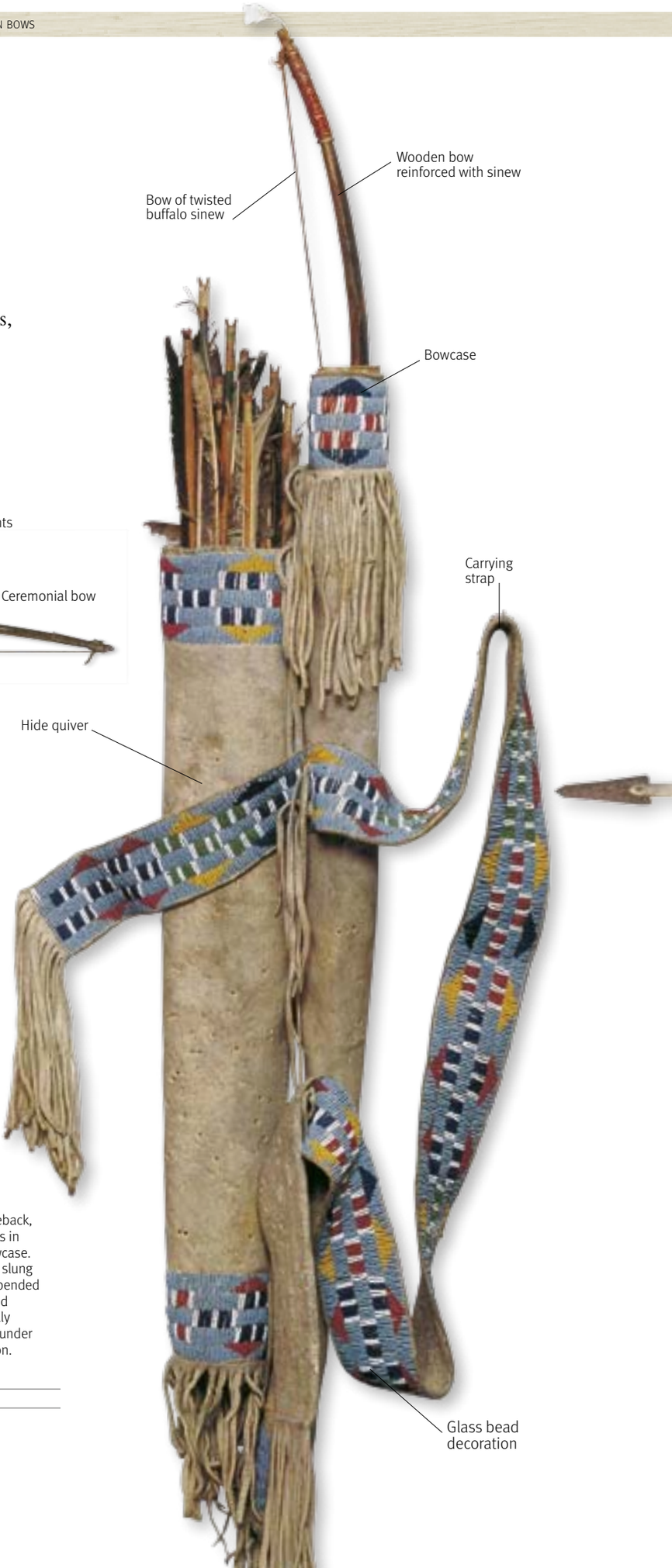
DATE	c.1900
ORIGIN	US
LENGTH	BOW 5 FT (1.5 M)



THOMPSON BOW AND ARROWS

The Thompson are a plateau people of the northwest United States. This set of maplewood bow and unfletched arrows was specially made for ceremonial use. For a four-day period after the death of a tribe member, the arrows were shot at a rush figure of a deer suspended from a hut roof. The bow and arrows were never used again.

DATE	c.1900
ORIGIN	US
LENGTH	BOW 5 FT (1.5 M)



QUIVER AND BOWCASE

Plains Indians, who often fought and hunted on horseback, carried their bow and arrows in a combined quiver and bowcase. Made of animal hide, it was slung across the rider's back, suspended on a strap. The quiver carried about 20 arrows, traditionally tipped with stone but later, under European influence, with iron.

DATE	c.1900
ORIGIN	US

THE BUFFALO HUNTER
A Plains Indian races a fleeing bison, aiming to shoot his arrow from point-blank range. The bows were mostly short—at most 3 ft (1 m) in length—for ease of use on horseback. American soldiers who fought the Indians in the Plains Wars (1860s–80s) testified to the accuracy and power of their shots, which were more effective than their erratic use of firearms.

FULL VIEW

COPPER INUIT BOW AND ARROW
The Inuit peoples of the Arctic used bows to hunt caribou and other game. This bow and arrow were made by the Copper Inuit of northwest Canada. As their name suggests, they made frequent use of copper, here employed for the arrow tip. Sinew cordage reinforces the back of the bow.

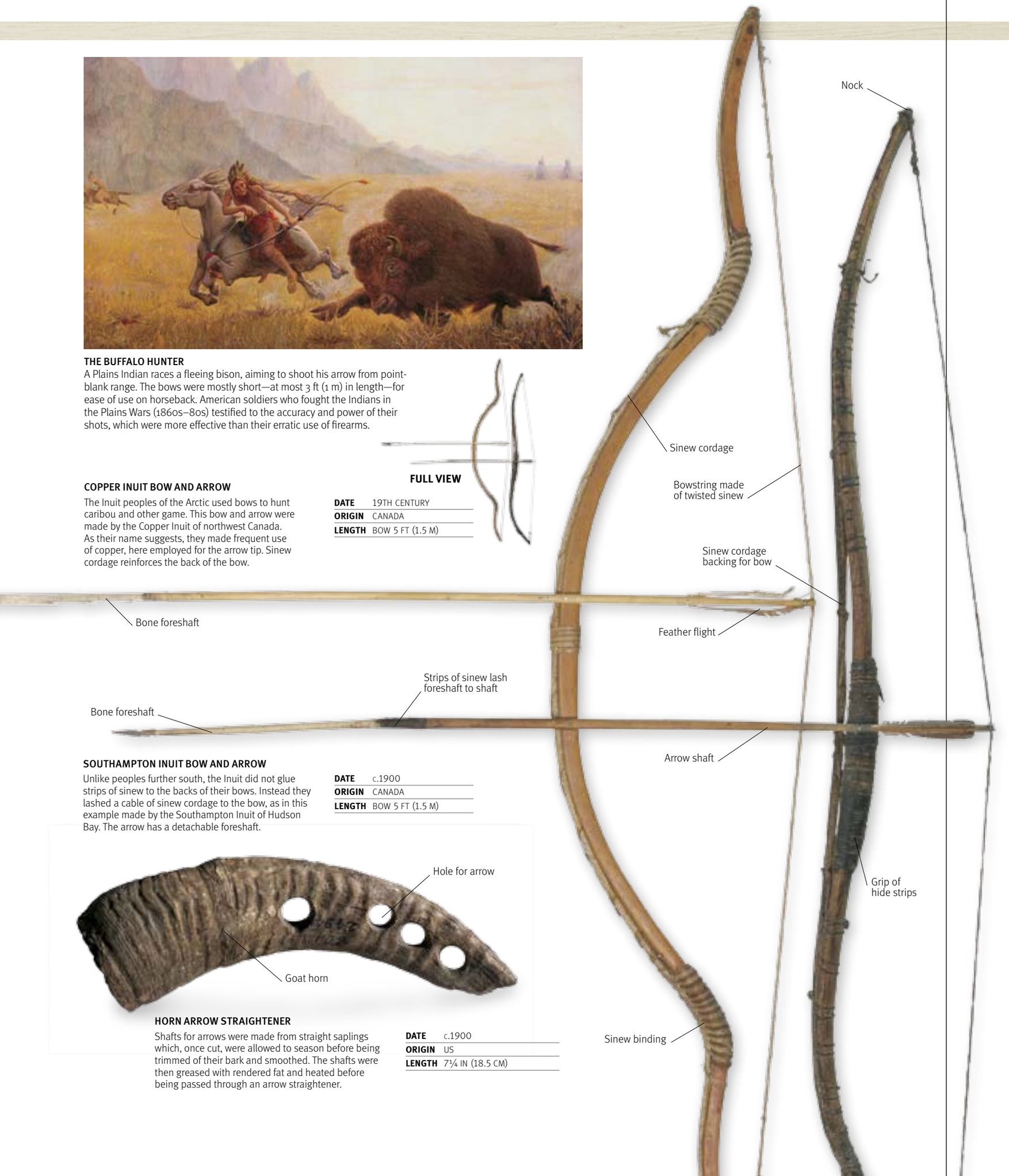
DATE	19TH CENTURY
ORIGIN	CANADA
LENGTH	BOW 5 FT (1.5 M)

SOUTHAMPTON INUIT BOW AND ARROW
Unlike peoples further south, the Inuit did not glue strips of sinew to the backs of their bows. Instead they lashed a cable of sinew cordage to the bow, as in this example made by the Southampton Inuit of Hudson Bay. The arrow has a detachable foreshaft.

DATE	c.1900
ORIGIN	CANADA
LENGTH	BOW 5 FT (1.5 M)

HORN ARROW STRAIGHTENER
Shafts for arrows were made from straight saplings which, once cut, were allowed to season before being trimmed of their bark and smoothed. The shafts were then greased with rendered fat and heated before being passed through an arrow straightener.

DATE	c.1900
ORIGIN	US
LENGTH	7¼ IN (18.5 CM)



AUSTRALIAN BOOMERANGS AND SHIELDS

ALTHOUGH BOOMERANGS ARE not unique to Australia, they are most associated with its indigenous peoples. A mix of aerodynamic and gyroscopic effects determines their curving flight. Aborigines used boomerangs, throwing sticks, spears, and stone axes for hunting and in skirmishes. Battles consisting of an exchange of missiles warded off by shields caused limited casualties. Once European settlers arrived with firearms, Aboriginal weaponry was redundant for warfare.

INDIGENOUS AUSTRALIAN
In the 1870s, Australian photographer John William Lindt made studio portraits of Aborigines from Clarence Valley, New South Wales. Intending to document a vanishing way of life, he posed them with their artefacts, including here a boomerang and shield.

FULL VIEW

HOOKED BOOMERANG
This mulga-wood boomerang, similar to many used in the 19th century, was carved from the junction between a tree root and a trunk, exploiting the natural curve of the wood to create a strong hook. When the boomerang was used for fighting, the hook might catch on an enemy's shield or club and swing round to strike him on the face or body.

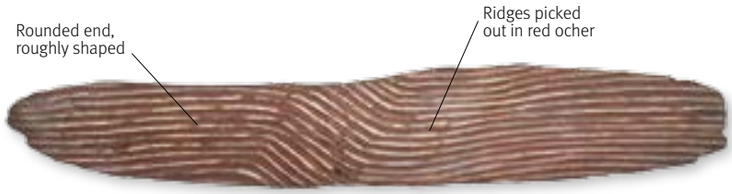
DATE	20TH CENTURY
ORIGIN	NORTHERN CENTRAL AUSTRALIA
WEIGHT	1 LB (0.41 KG)
LENGTH	28¾ IN (73.1 CM)

CONVEX BOOMERANG
This boomerang from Queensland has a convex surface on both sides—some are convex on one side and flat on the other. Incisions on its curved inner edge show that it has been used for cutting or sawing, as well as for throwing. The surface has been finely grooved to enhance the natural grain of the wood.

DATE	LATE 19TH CENTURY
ORIGIN	QUEENSLAND, AUSTRALIA
WEIGHT	¾ LB (0.32 KG)
LENGTH	28½ IN (72.4 CM)

SHARP-ANGLED BOOMERANG
This boomerang or club has been finely carved to form a sharp angle. It is decorated on both sides with a design in red ocher and white pipe clay. Abstract designs of this kind are often connected with the Aboriginal "dreamtime" myths that link the clan or tribe to its ancestors and its local territory.

DATE	19TH CENTURY
ORIGIN	QUEENSLAND, AUSTRALIA
WEIGHT	1¼ LB (0.57 KG)
LENGTH	29½ IN (75 CM)



PARRYING SHIELD

Despite its elongated shape, a parrying shield of this kind was an effective defense against hostile missiles such as throwing sticks or boomerangs, if used deftly by an alert warrior to ward them off. The design of longitudinal and diagonal lines, picked out in red and white ochers, is typical of indigenous peoples in this area.

DATE	19TH CENTURY
ORIGIN	WESTERN AUSTRALIA
WEIGHT	1 LB (0.49 KG)
LENGTH	28 IN (73 CM)

BANDED SHIELD

This parrying shield is decorated with bands of red ocher and an intricate pattern of finely engraved lines. The markings at the ends may represent clan affiliations. Held by a grip at the back made of solid wood, the shield was robust enough to deflect a boomerang or other missile even if thrown with considerable force.

DATE	19TH CENTURY
ORIGIN	AUSTRALIA
WEIGHT	2½ LB (1.19 KG)
LENGTH	32½ IN (83 CM)

CARVED SHIELD

This shield, known as a *gidyar*, originates from the Cairns District, and is similar to types used in the 19th century. It has been carved out of wood and painted in a bold design. Although it may have found multiple other uses, the shield was almost certainly employed primarily for purposes of display in ceremonial dances.

DATE	20TH CENTURY
ORIGIN	QUEENSLAND, AUSTRALIA
LENGTH	26 IN (66 CM)

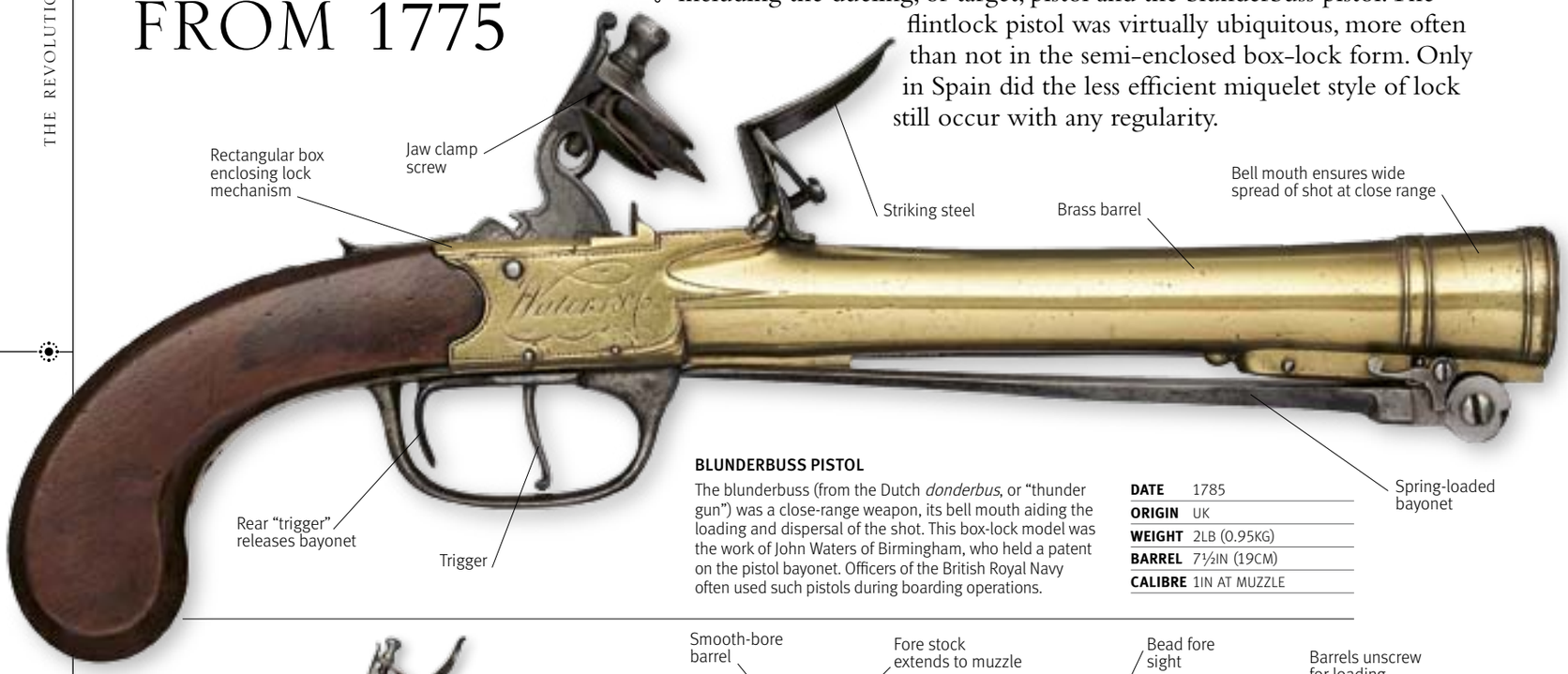
RIDGED SHIELD

This shield from northern Queensland is made out of light ridged wood attached to a solid-wood handle at the back. It is a decorative work as well as a piece of defensive equipment. The meaning of the colorful design on the shield is uncertain, but it may refer to the achievements and status of the warrior who owned it.

DATE	c.1900
ORIGIN	QUEENSLAND, AUSTRALIA
LENGTH	38¼ IN (97 CM)

FLINTLOCK PISTOLS FROM 1775

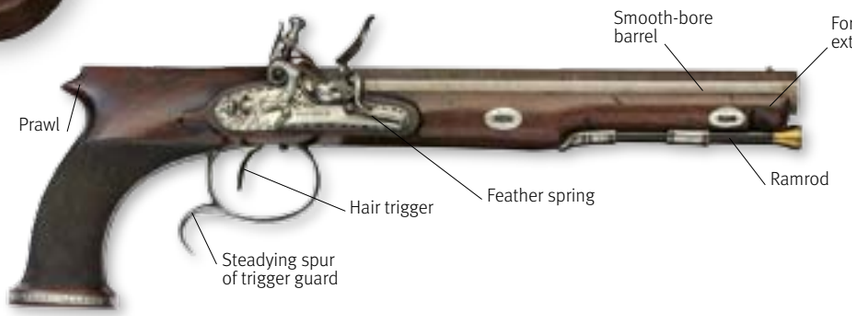
BY THE LAST QUARTER of the 18th century, before police forces were widely established, pistols were commonplace in the homes of the wealthy, and pocket models were often carried by gentlemen and villains alike. Several types of pistol designed for specific purposes had been developed, including the dueling, or target, pistol and the blunderbuss pistol. The flintlock pistol was virtually ubiquitous, more often than not in the semi-enclosed box-lock form. Only in Spain did the less efficient miquelet style of lock still occur with any regularity.

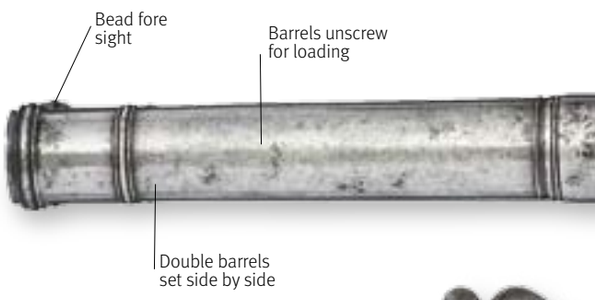


BLUNDERBUSS PISTOL

The blunderbuss (from the Dutch *donderbus*, or "thunder gun") was a close-range weapon, its bell mouth aiding the loading and dispersal of the shot. This box-lock model was the work of John Waters of Birmingham, who held a patent on the pistol bayonet. Officers of the British Royal Navy often used such pistols during boarding operations.

DATE	1785
ORIGIN	UK
WEIGHT	2LB (0.95KG)
BARREL	7½IN (19CM)
CALIBRE	1IN AT MUZZLE

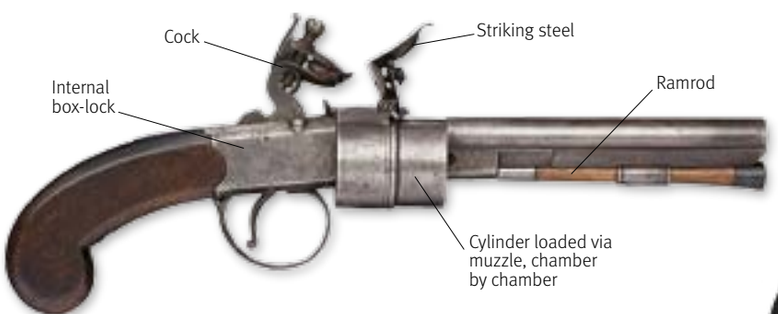




MIQUELET DUELLING PISTOL

Pistols specifically designed for dueling made their first appearance in Britain after 1780. They were invariably sold as a matched pair, cased, with all the accessories necessary for their use. "Saw handle" butts with pronounced prawls and steadying spurs on the trigger guard were later additions, as was the custom of stocking the pistols fully, to the muzzle.

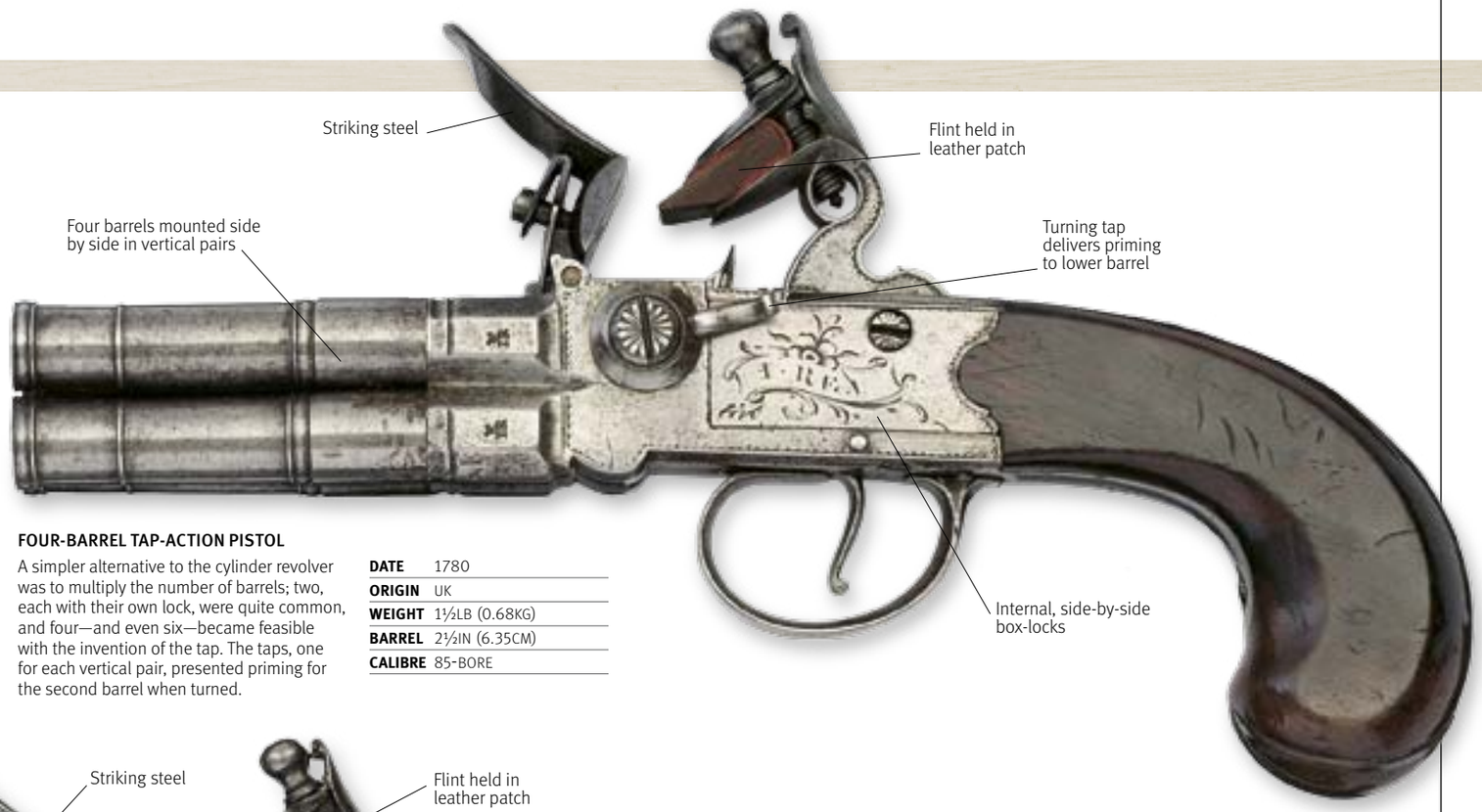
DATE	1815
ORIGIN	UK
WEIGHT	2¼LB (1KG)
BARREL	9IN (23CM)
CALIBRE	34-BORE



FLINTLOCK REVOLVER

Around 1680, John Dafte of London designed a pistol with a revolving, multichambered cylinder that was indexed (rotated) by the cocking action. Elisha Collier of Boston gained a British patent for an improved version in 1814; it was produced in London by John Evans in 1819. The indexing mechanism was unreliable, and the cylinder was usually turned by hand.

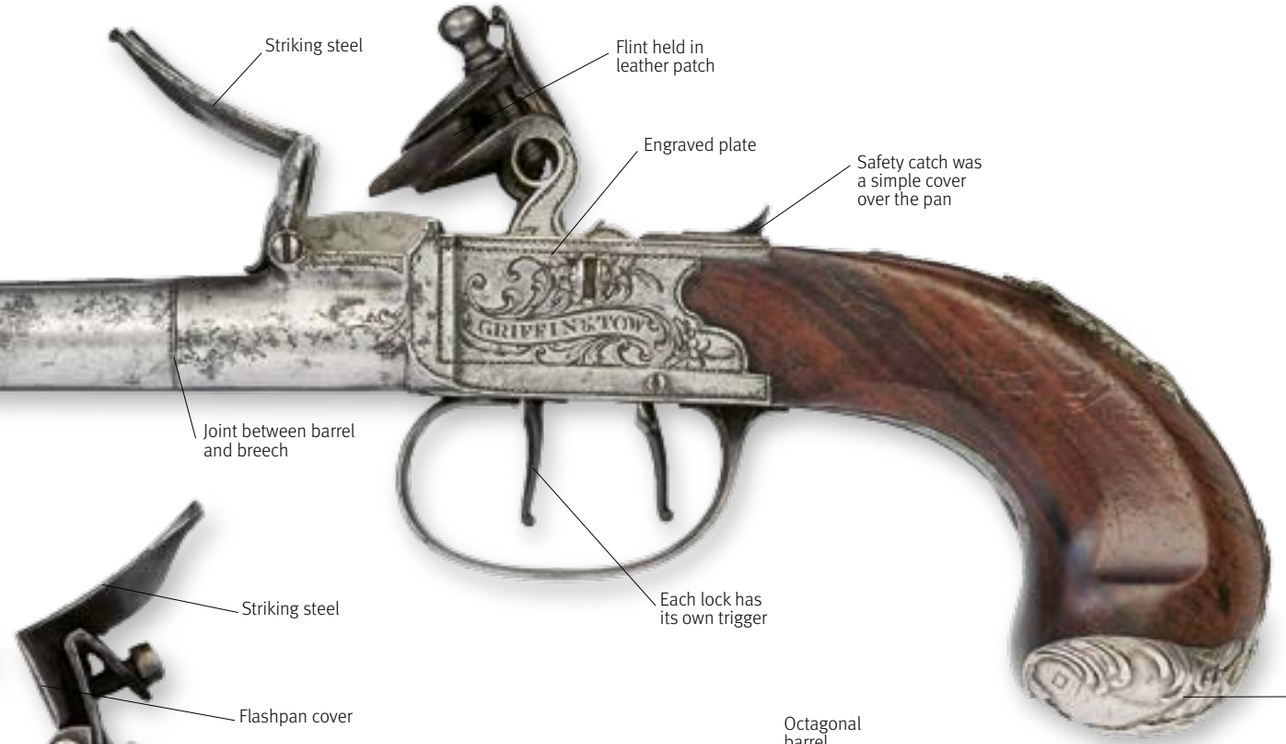
DATE	c.1820
ORIGIN	UK
WEIGHT	1½LB (0.68KG)
BARREL	5IN (12.4CM)
CALIBRE	.45IN



FOUR-BARREL TAP-ACTION PISTOL

A simpler alternative to the cylinder revolver was to multiply the number of barrels; two, each with their own lock, were quite common, and four—and even six—became feasible with the invention of the tap. The taps, one for each vertical pair, presented priming for the second barrel when turned.

DATE	1780
ORIGIN	UK
WEIGHT	1½LB (0.68KG)
BARREL	2½IN (6.35CM)
CALIBRE	85-BORE



"QUEEN ANNE" PISTOL

The distinctive form of the Queen Anne pistol continued long after the eponymous lady's death in 1714. The tapered "cannon" barrel screwed into a standing breech in which the lock plate, trigger plate, and butt strap were forged in one piece. This double-barrelled example is by Griffin and Tow.

DATE	1775
ORIGIN	UK
WEIGHT	0.8KG (1¾LB)
BARREL	11.7CM (4½IN)
CALIBRE	48-BORE

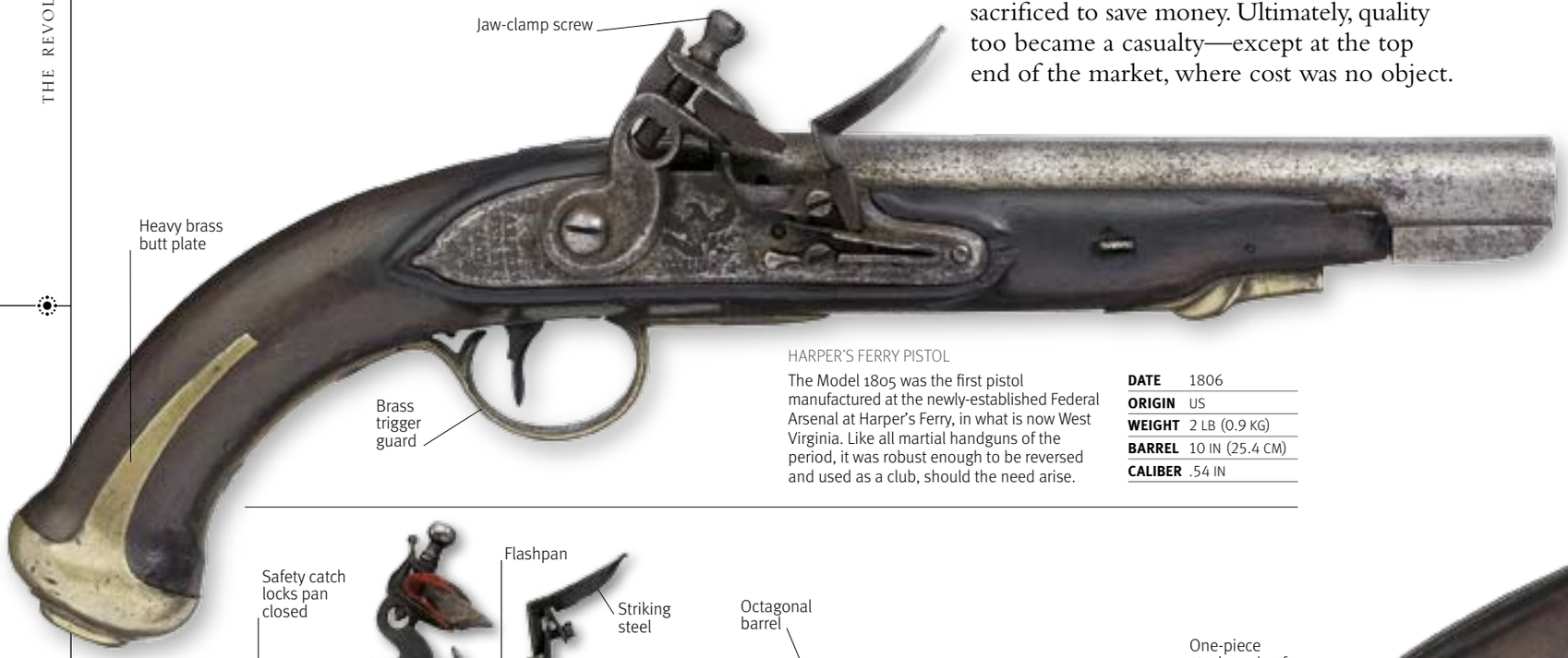
POCKET PISTOL

Short-barrelled pistols replaced the sword as the gentleman's weapon of self-defence. Box-locks were preferred to side-locks, because they were less likely to catch in the clothing. Pistols often had a bayonet, which was released by pulling back the trigger guard.

DATE	1800
ORIGIN	BELGIUM
WEIGHT	0.478KG (1LB)
BARREL	11CM (4¼IN)
CALIBRE	.59IN

FLINTLOCK PISTOLS TO 1850

MASS PRODUCTION WAS UNKNOWN before the 19th century. Until then, firearms had no interchangeable parts, because each element was made by hand for each individual weapon. Even relatively unsophisticated pistols were expensive, both to buy and to repair, despite the fact that demand was high and increasing. The decoration that had graced many earlier weapons was sacrificed to save money. Ultimately, quality too became a casualty—except at the top end of the market, where cost was no object.



HARPER'S FERRY PISTOL

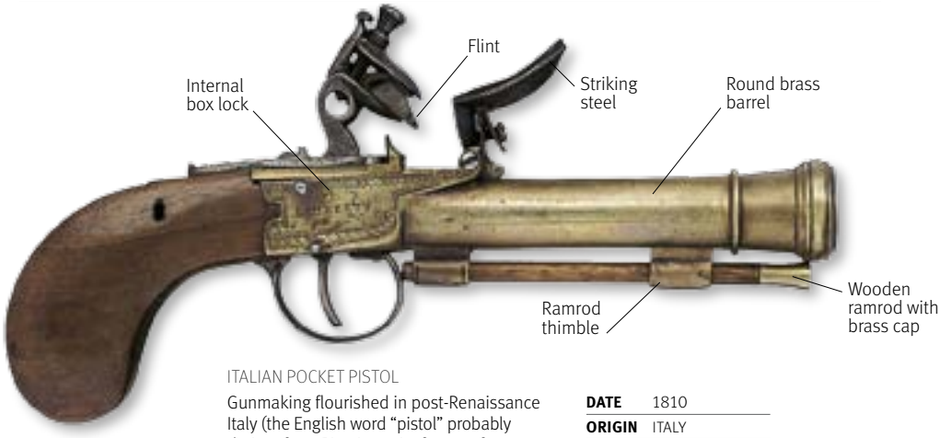
The Model 1805 was the first pistol manufactured at the newly-established Federal Arsenal at Harper's Ferry, in what is now West Virginia. Like all martial handguns of the period, it was robust enough to be reversed and used as a club, should the need arise.

DATE	1806
ORIGIN	US
WEIGHT	2 LB (0.9 KG)
BARREL	10 IN (25.4 CM)
CALIBER	.54 IN

FLEMISH POCKET PISTOL

This simple box-lock pocket pistol has an integral spring-loaded bayonet, operated by pulling back on the trigger guard. There is some engraving on the lock plates and the butt is finely carved. It is the work of A. Juliard, a Flemish gunmaker of some repute.

DATE	1805
ORIGIN	NETHERLANDS
WEIGHT	1 LB (.5 KG)
BARREL	4¼ IN (10.9 CM)
CALIBER	33-BORE



ITALIAN POCKET PISTOL

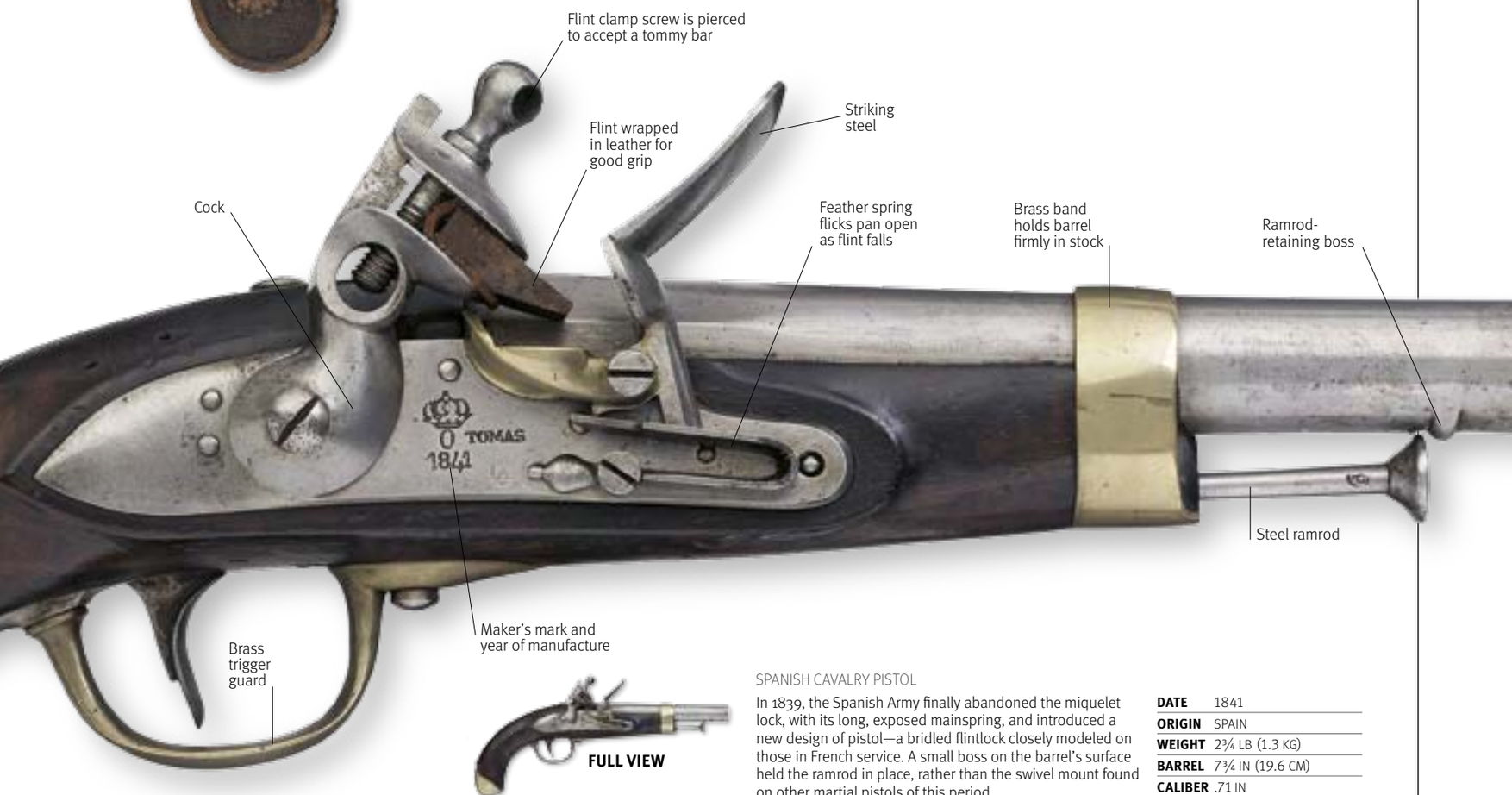
Gunmaking flourished in post-Renaissance Italy (the English word "pistol" probably derives from Pistoia, a city famous for gun manufacture). Although the industry was in decline by the 19th century, craftsmen like Lamberti, creator of this pistol, still thrived.

DATE	1810
ORIGIN	ITALY
WEIGHT	1½ LB (0.62 KG)
BARREL	4¾ IN (12.3 CM)
CALIBER	.85 IN

TURN-OFF POCKET PISTOL

The screw-on barrel, which could be removed with a wrench or key, allowed this pistol to be loaded with a tighter-fitting ball and thus shoot both harder and straighter. Turn-off pistols were slow to reload, but their small size made them popular for self-defense.

DATE	1810
ORIGIN	FRANCE
WEIGHT	¾ LB (0.32 KG)
BARREL	1½ IN (4 CM)
CALIBER	33-BORE



FULL VIEW

SPANISH CAVALRY PISTOL

In 1839, the Spanish Army finally abandoned the miquelet lock, with its long, exposed mainspring, and introduced a new design of pistol—a bridled flintlock closely modeled on those in French service. A small boss on the barrel's surface held the ramrod in place, rather than the swivel mount found on other martial pistols of this period.

DATE	1841
ORIGIN	SPAIN
WEIGHT	2¾ LB (1.3 KG)
BARREL	7¾ IN (19.6 CM)
CALIBER	.71 IN

NEW LAND-PATTERN PISTOL

The Land-Pattern Pistol was introduced in 1756, and was subsequently modified in very minor ways. It was a competent, sturdy design and was to remain in service until flintlocks gave way to percussion in the 1840s. A version with a flat butt and lanyard ring was produced for cavalry, and copies were made—by Ezekiel Baker—for issue to the East India Company's forces.

DATE	1810
ORIGIN	UK
WEIGHT	1¼ LB (2.95 KG)
BARREL	9 IN (22.9 CM)
CALIBER	.65 IN

PERCUSSION CAP PISTOLS

FULMINATE OF MERCURY was first used to ignite gunpowder in a gun barrel by Scotsman Alexander Forsyth, who took out a patent in 1807. It took some time to find a successful way of presenting the fulminate charge, or primer, to the breech. The solution, called the cap, consisted of primer sandwiched between two copper-foil sheets. The cap was shaped to fit over a pierced nipple set in what had been the touch-hole. It was struck by a hammer, rather than a cock and flint. Pistols using this system appeared around 1820.

BELGIAN DUELING/TARGET PISTOL

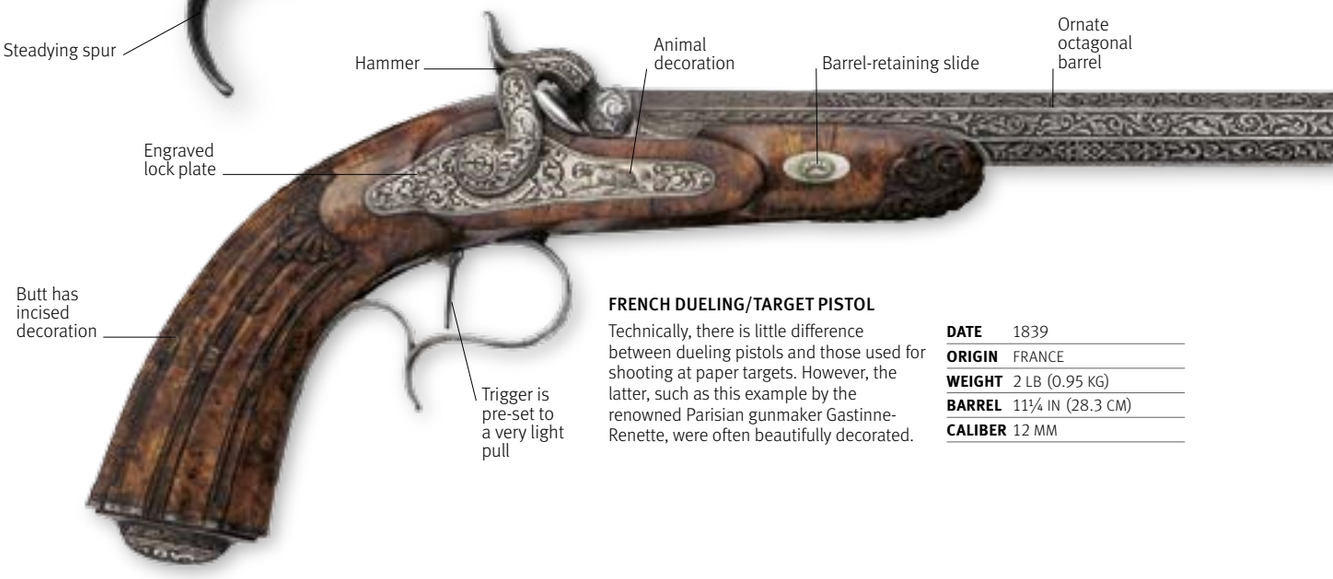
Percussion-cap pistols were more reliable than even the best flintlocks, and one of their earliest uses was as dueling pistols. This half-stocked pistol by Folville, one of a matched and boxed pair, is typical of those produced in Liège, in what is now Belgium.

DATE	1830
ORIGIN	BELGIUM
WEIGHT	2 LB (0.88 KG)
BARREL	9¼ IN (23.8 CM)
CALIBER	8 MM

ENGLISH DUELING/TARGET PISTOL

Despite their lack of overt decoration, dueling pistols were usually produced without regard to cost. This example, one of a pair, was the work of Isaac Riviere of London. Riviere had considerable influence over the design of percussion pistols, and patented his own lock in 1825.

DATE	c.1830
ORIGIN	UK
WEIGHT	2½ LB (1.15 KG)
BARREL	9½ IN (24.1 CM)
CALIBER	44-BORE



FRENCH DUELING/TARGET PISTOL

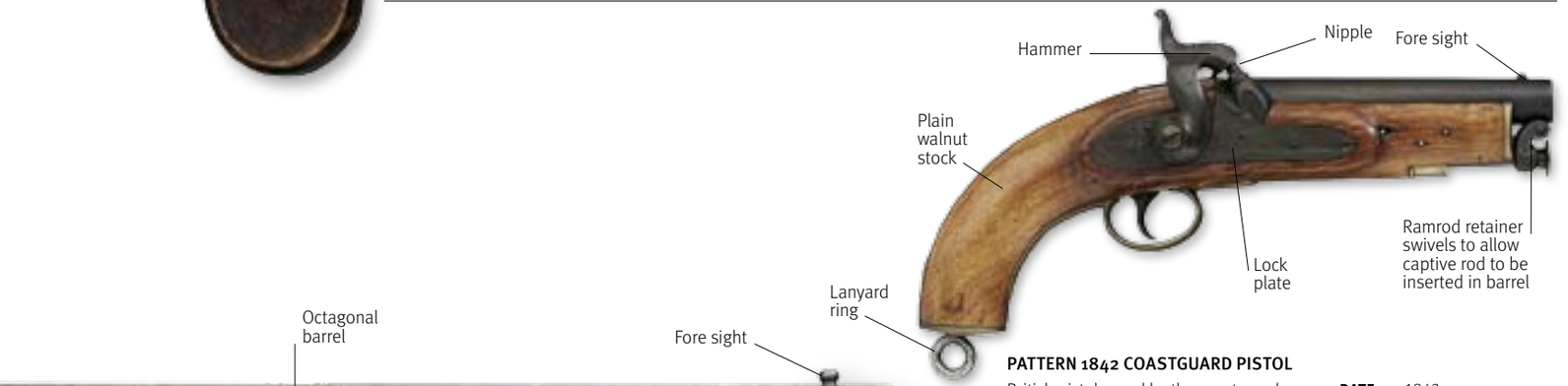
Technically, there is little difference between dueling pistols and those used for shooting at paper targets. However, the latter, such as this example by the renowned Parisian gunmaker Gastinne-Renette, were often beautifully decorated.

DATE	1839
ORIGIN	FRANCE
WEIGHT	2 LB (0.95 KG)
BARREL	11¼ IN (28.3 CM)
CALIBER	12 MM

COOPER UNDER-HAMMER PISTOL

Joseph Rock Cooper was a prolific English firearms inventor. One of his patents was for this pistol, which has an under-hammer by a Belgian named Mariette. In effect it is a "double-action" pistol: pulling the trigger lifts and then releases the hammer.

DATE	1849
ORIGIN	UK
WEIGHT	½ LB (0.27 KG)
BARREL	4 IN (10 CM)
CALIBER	.45 IN



PATTERN 1842 COASTGUARD PISTOL

British pistols used by the coastguard, police, and other security agencies were similar in style to the Land- and Sea-Pattern pistols of the army and navy, but usually lighter and smaller. Revolvers replaced Pattern 1842 pistols in the 1850s.

DATE	1842
ORIGIN	UK
WEIGHT	2½ LB (1.05 KG)
BARREL	6 IN (15 CM)
CALIBER	24-BORE

BAR-HAMMER "PEPPERBOX" PISTOL

Pepperbox pistols offered the advantage of multi-shot cylinder revolvers without their principle drawback—the leakage of propellant gas between chamber and barrel. Unfortunately, the type was generally inaccurate, except at point-blank range.

DATE	1849
ORIGIN	UK
WEIGHT	2¼ LB (1.01 KG)
BARREL	3½ IN (9.1 CM)
CALIBER	.55 IN

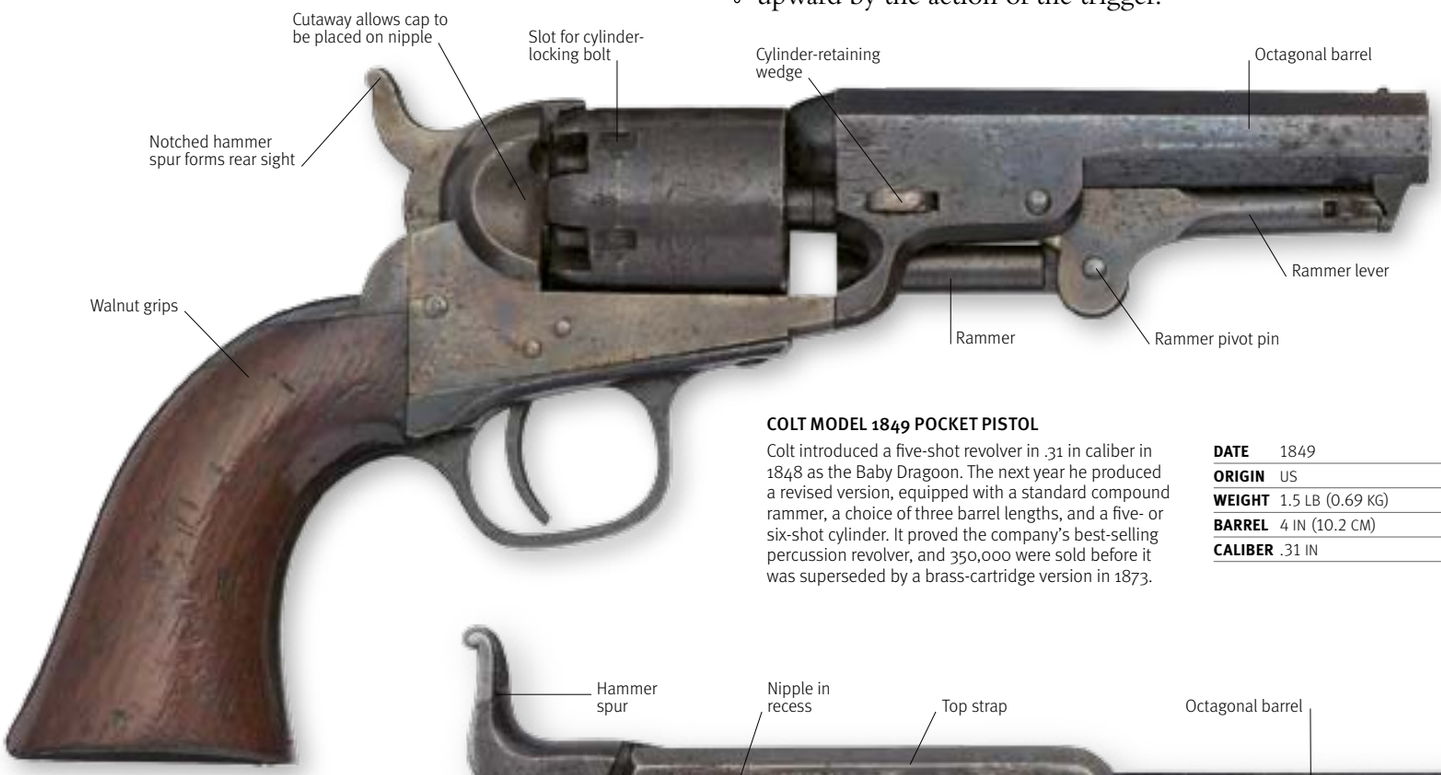
SHARPS BREECH-LOADING PISTOL

Christian Sharps was famous for his breech-loading rifles and carbines for military and sporting use. He also made pistols based on the same principles as his early rifles. The falling breech cut off the rear of the linen cartridge when it was returned to battery.

DATE	c.1860
ORIGIN	US
WEIGHT	2 LB (0.96 KG)
BARREL	5 IN (12.7 CM)
CALIBER	.34 IN

AMERICAN PERCUSSION CAP REVOLVERS

SAMUEL COLT CLAIMED that the design of his cylinder revolver, patented in 1835, was inspired by the locking mechanism of a sailing ship's steering wheel. A pawl linked to the hammer breast engaged with a ratchet machined into the cylinder's rear face. As the hammer was pulled back, the pawl indexed the ratchet by one stop, bringing a fresh chamber into line with the barrel and its percussion cap under the hammer. The cylinder was locked in place at the moment of firing by a vertical bolt driven upward by the action of the trigger.



COLT MODEL 1849 POCKET PISTOL

Colt introduced a five-shot revolver in .31 in caliber in 1848 as the Baby Dragoon. The next year he produced a revised version, equipped with a standard compound rammer, a choice of three barrel lengths, and a five- or six-shot cylinder. It proved the company's best-selling percussion revolver, and 350,000 were sold before it was superseded by a brass-cartridge version in 1873.

DATE	1849
ORIGIN	US
WEIGHT	1.5 LB (0.69 KG)
BARREL	4 IN (10.2 CM)
CALIBER	.31 IN

COLT MODEL 1855 POCKET PISTOL

Such was the success of the Pocket Pistol that Colt launched another model in 1855, this one to the design of Elisha Root, the Works Superintendent, who did much to modernize manufacture. Root's pistol had a top strap—its first use in a Colt pistol—a side-mounted hammer, and a stud trigger. The latter was not popular, and though the pistol was produced in seven different models and both .28 in and .31 in caliber, only some 40,000 were sold before it was discontinued in 1870.

DATE	1855
ORIGIN	US
WEIGHT	1 LB (0.5 KG)
BARREL	3½ IN (8.9 CM)
CALIBER	.28 IN

COLT NAVY MODEL 1851

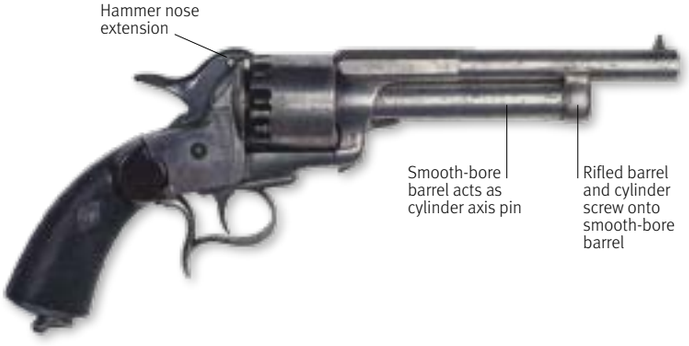
In 1851, Colt introduced a lighter pistol, the Navy Model, in .36 in rather than .44 in caliber. That same year, he traveled to London to show at the Great Exhibition, and obtained an order from the British government. The example shown here is one of the pistols produced at the factory the company established in London in 1853. Its cylinder is engraved with a naval scene.

DATE	1851
ORIGIN	US
WEIGHT	2¾ LB (1.2 KG)
BARREL	7½ IN (19 CM)
CALIBER	.36 IN

COLT SECOND MODEL DRAGOON PISTOL

Colt's mainstay during the first decade and a half of the percussion era was the Dragoon Pistol, so called because it was intended as a side-arm for cavalrymen. It first went into limited production at Whitneyville in 1847. Later that same year, Colt established a new factory at Hartford, expressly to produce the Dragoon Pistol to fulfil an army contract.

DATE	1849
ORIGIN	US
WEIGHT	4 LB (1.93 KG)
BARREL	7½ IN (19 CM)
CALIBER	.44 IN



LE MAT PISTOL

Jean-Alexandre Le Mat's revolver design was produced in both pistol and rifle form. The nine-chambered cylinder revolved around not a pin but a second, unrifled barrel, which was charged from the muzzle with pellets. The hammer had a hinged extension to its nose, which could be angled up or down to fire either barrel.

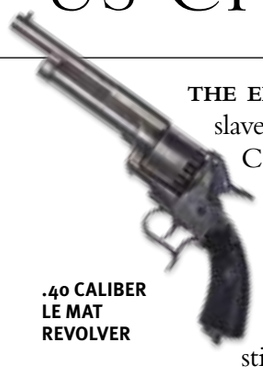
DATE	1864
ORIGIN	US
WEIGHT	3½ LB (1.64 KG)
BARREL	LOWER 5 IN (12.7 CM)
CALIBER	.3 IN AND 16-BORE

STARR SINGLE-ACTION ARMY MODEL

Nathan Starr was a pioneer of the break-open pistol, in which the barrel, top strap, and cylinder were hinged at the front of the frame before the trigger guard. The forked top strap passed over the hammer and was retained by a knurled screw. When broken open, the cylinder could be removed for reloading.

DATE	1864
ORIGIN	US
WEIGHT	3 LB (1.35 KG)
BARREL	7½ IN (19.2 CM)
CALIBER	.44 IN

US CIVIL WAR INFANTRYMAN



.40 CALIBER LE MAT REVOLVER

THE ELECTION AS US PRESIDENT OF ABRAHAM LINCOLN, who opposed the spread of slavery, in 1860 led 11 southern states to secede from the Union and form the Confederacy. A bloody civil war ensued. Initially, hundreds of thousands volunteered to fight. Later, conscription was successfully introduced in the Confederate South; it was less effective in the Union states of the North, where the wealthy often evaded service by paying others to fight in their place. Both Confederate and Union troops were hard-bitten characters unused to obedience, but they showed tenacity, sticking to the fight when casualties were high and conditions awful.

INFANTRY FIGHTING

From April 1861 to April 1865, 3 million men joined the forces of the Union and the Confederacy. Most were infantrymen who walked or marched everywhere, carrying equipment, ammunition, personal items, and a field pack. The main weapon was the muzzle-loaded rifle-musket, firing Minié bullets. Although an advance over the flintlock musket, it still required infantry to fire in volleys from a standing position. On the offensive, infantry had to advance steadily across open ground in the face of withering fire from rifle-muskets and artillery that decimated their ranks. Both sides used the same basic weaponry, but the North was far more successful in equipping its armies. Union infantrymen were well supplied with standard uniform, boots of the right size, bullets, and powder, while the Southern infantry were short of everything but courage. Around 620,000 soldiers lost their lives, more through disease than combat.

BATTLE OF BULL RUN
The first major battle, First Bull Run was a chaotic affair. Confederate Jeb Stuart led the war's only significant cavalry charge. Exotic Zouave uniforms were worn by some volunteers on both sides, adding to the confusion.

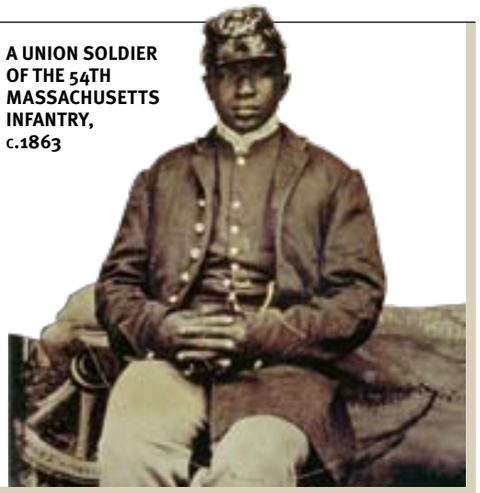
"THE MAN WHO DOES NOT DREAD TO DIE OR TO BE MUTILATED IS A LUNATIC."

CIVIL WAR VETERAN

VOLUNTEER SOLDIERS
A Union infantry lieutenant, on the right, and two enlisted men during the first year of the war. Such early volunteers—motivated by enthusiasm for the cause or by a naive thirst for adventure—mostly elected their own officers, and tended to obey orders only when they saw fit.

FIGHTING FOR FREEDOM

At the start of the Civil War, African Americans were excluded from combat by both sides. During 1862 Union officers advanced from using escaped slaves as laborers to arming them. The first regiments of black volunteers were officially raised in the North in 1863. Around 180,000 ex-slaves and free black men served in the Union forces, in segregated regiments and mostly under white officers. Many distinguished themselves in combat, the 54th Massachusetts regiment, for example, performed outstandingly in the storming of Fort Wagner in 1863. The black troops' contribution to victory helped win Union support for the abolition of slavery.



A UNION SOLDIER OF THE 54TH MASSACHUSETTS INFANTRY, c.1863

UNIFORM OF A CONFEDERATE SOLDIER
Few Confederate soldiers managed to wear the regulation gray coat, gray forage cap, and blue trousers. Short jackets were more common, as were varieties of "butternut" brown or beige clothing.

UNIFORM OF A UNION SOLDIER
This is the winter uniform of a infantryman in the New York Volunteers. The Hardee felt hat, although regulation dress, was rarely worn, most soldiers preferring a lighter kepi or slouch hat.

TOOLS OF COMBAT

ENFIELD BAYONET

ENFIELD RIFLE-MUSKET

UNION SOLDIER'S METAL CANTEEN

LEATHER KNAPSACK

BRITISH PERCUSSION CAP REVOLVERS

ALTHOUGH LONDON GUNMAKERS, notably Robert Adams, were making revolvers by the mid-19th century, it was Samuel Colt's display at the Great Exhibition of 1851 that ignited interest in such pistols. For some years, Colt had the British market almost to himself, but by the decade's end, domestic gunmakers' revolvers had overtaken American Colts in popularity. Adams' pistols had double-action ("self-cocking") locks—a characteristic of British revolvers from the outset. Later models could also function in single-action mode.

KERR DOUBLE-ACTION REVOLVER

To address doubts about the reliability of the revolver, James Kerr fitted his with a simple box-lock and a side-mounted hammer. The lock was retained by two screws, and could be easily removed. Should a component—the spring, for example—break, any gunsmith would have been able to repair it. Kerr's five-chambered pistols came in either 54-bore or 90-bore caliber. They were manufactured until the mid-1870s.

DATE	1856
ORIGIN	UK
WEIGHT	2½ LB (1.2 KG)
BARREL	5¾ IN (14.7 CM)
CALIBER	54-BORE

JOSEPH LANG TRANSITIONAL REVOLVER

Open-framed "transitional" pistols combined elements of both the pepperbox pistols they superseded and the true revolvers. They continued to be produced, mostly in Europe, even after much more sophisticated designs had appeared. This example is of the type produced by one of the best known proponents, Joseph Lang of London. Lang was more successful than most gunmakers of the time in solving the problem of propellant gas leaking between chamber and barrel.

DATE	1855
ORIGIN	UK
WEIGHT	3 LB (1.36 KG)
BARREL	6 IN (15.2 CM)
CALIBER	54-BORE

TRANSITIONAL REVOLVER

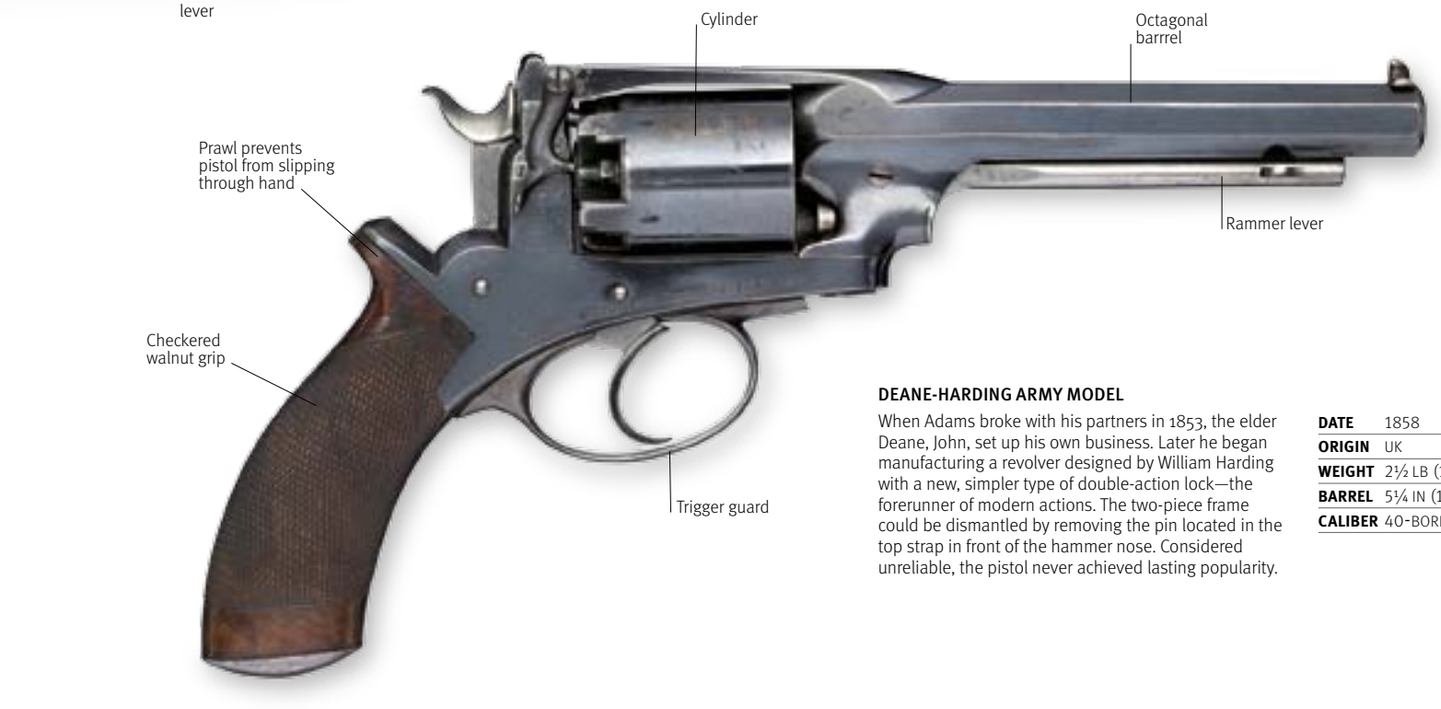
By the late 1850s, there was considerable demand in Britain for cylinder revolvers, but the best of them, by Colt, Deane, or Adams, were very expensive. Cheaper designs such as this example, with a bar hammer derived from a pepperbox revolver, were less satisfactory, with a tendency to discharge two cylinders at once because of the lack of partitions between the nipples.

DATE	c.1855
ORIGIN	UK
WEIGHT	1¾ LB (0.81 KG)
BARREL	5¼ IN (13.5 CM)
CALIBER	.4 IN

ADAMS DOUBLE-ACTION REVOLVER MODEL 1851

This revolver—Robert Adams' first—is also called the Deane, Adams & Deane Model (he was in partnership at the time). The entire frame, barrel, and butt were forged out of a single iron billet, making it extremely strong. Adams' lock was later replaced by a superior design by a young army officer, F.B.E. Beaumont. The Beaumont-Adams was adopted by the British Army in 1855.

DATE	1851
ORIGIN	UK
WEIGHT	2¾ LB (1.27 KG)
BARREL	7½ IN (19 CM)
CALIBER	40-BORE



DEANE-HARDING ARMY MODEL

When Adams broke with his partners in 1853, the elder Deane, John, set up his own business. Later he began manufacturing a revolver designed by William Harding with a new, simpler type of double-action lock—the forerunner of modern actions. The two-piece frame could be dismantled by removing the pin located in the top strap in front of the hammer nose. Considered unreliable, the pistol never achieved lasting popularity.

DATE	1858
ORIGIN	UK
WEIGHT	2½ LB (1.15 KG)
BARREL	5¼ IN (13.5 CM)
CALIBER	40-BORE

BRASS CARTRIDGE PISTOLS

SMITH & WESSON ACQUIRED the patent for a revolver with a bored-through cylinder to accept brass cartridges in 1856, from Rollin White. By the time their protection expired in 1869, the center-fire cartridge (with the primer located in the center, rather than in the rim, as in earlier examples) had been devised, and the world's gunmakers were poised to begin manufacturing what would prove to be the cylinder revolver in its final form. Later refinements made it possible to charge and empty the chambers more rapidly.

REMINGTON DOUBLE DERRINGER

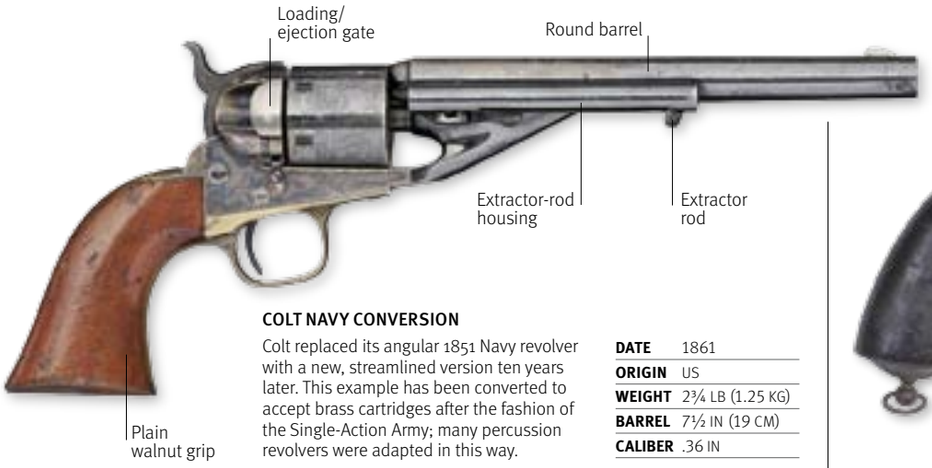
Henry Deringer was a Philadelphia gun maker who specialized in pocket pistols; his name was ascribed—with the mysterious addition of a second "r"—to a genre of such weapons. The best known of them was the rimfire Remington Double Derringer, a top-hinged, tip-up, over-and-under design that was to remain in production until 1935.

DATE	1865
ORIGIN	US
WEIGHT	¾ LB (0.34 KG)
BARREL	3 IN (7.6 CM)
CALIBER	.41 IN

COLT MODEL 1873 SINGLE-ACTION ARMY

The Colt SAA married the single-action lock of the old Dragoon model to a bored-through cylinder in a solid frame, into which the barrel was screwed. It was loaded, and the spent case ejected, by way of the gate on the right of the frame, and a spring-loaded ejector was fitted. This is the long-barreled Cavalry model.

DATE	1873
ORIGIN	US
WEIGHT	2½ LB (1.1 KG)
BARREL	7½ IN (19 CM)
CALIBER	.45 IN



COLT NAVY CONVERSION

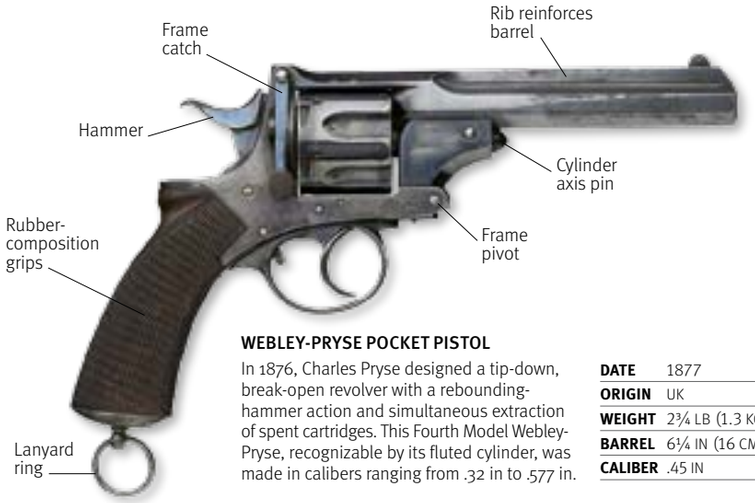
Colt replaced its angular 1851 Navy revolver with a new, streamlined version ten years later. This example has been converted to accept brass cartridges after the fashion of the Single-Action Army; many percussion revolvers were adapted in this way.

DATE	1861
ORIGIN	US
WEIGHT	2¾ LB (1.25 KG)
BARREL	7½ IN (19 CM)
CALIBER	.36 IN

LEFAUCHEUX PIN-FIRE REVOLVER

Casimir Lefaucheux invented the pin-fire cartridge in the mid-1830s, and his son Eugène later produced a six-shot, double-action revolver for it in 12 mm caliber. This is a Cavalry model of 1853. An Army model, without a steadying spur, was also produced.

DATE	1853
ORIGIN	FRANCE
WEIGHT	2¼ LB (0.95 KG)
BARREL	5¼ IN (13.5 CM)
CALIBER	12 MM



WEBLEY-PRYSE POCKET PISTOL

In 1876, Charles Pryse designed a tip-down, break-open revolver with a rebounding-hammer action and simultaneous extraction of spent cartridges. This Fourth Model Webley-Pryse, recognizable by its fluted cylinder, was made in calibers ranging from .32 in to .577 in.

DATE	1877
ORIGIN	UK
WEIGHT	2¾ LB (1.3 KG)
BARREL	6¼ IN (16 CM)
CALIBER	.45 IN

SMITH & WESSON NO. 3, RUSSIAN MODEL

Smith & Wesson's early designs had been top-hinged, tip-up revolvers, but for the No. 3 revolver it utilized a single-action, bottom-hinged design with an automatic simultaneous extractor. It soon won a contract to supply the Russian Army with 20,000 of these pistols, chambered for a special cartridge (the second version is shown above). They were the most accurate revolvers of their day.

DATE	1871
ORIGIN	US
WEIGHT	2¾ LB (1.25 KG)
BARREL	8 IN (20.3 CM)
CALIBER	.44 IN

FULL VIEW

◄ 216–217 PERCUSSION CAP PISTOLS ◄ 218–219 AMERICAN PERCUSSION CAP REVOLVERS ◄ 222–223 BRITISH PERCUSSION CAP REVOLVERS

COLT NAVY PISTOLS

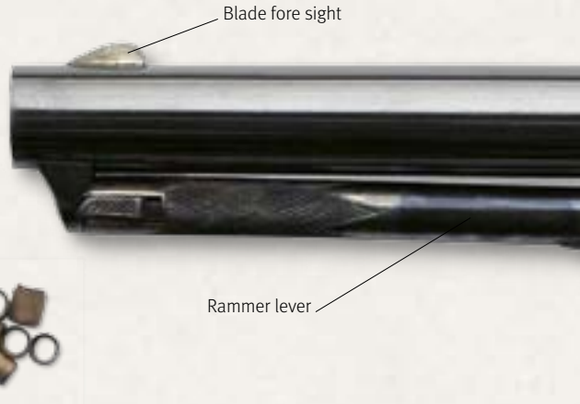
BY 1861, his patent protection a thing of the past, Samuel Colt had to rely on the quality of his products to outsell his competitors at a time (during the American Civil War) when the demand for firearms in the United States was running at an all-time high. His Hartford factory was in full production, under the superintendence of Elisha King Root, and that year, he introduced a new, streamlined version of his .36-caliber Navy revolver, which had appeared a decade earlier. Some 38,843 examples of the Model 1861 Navy were produced before it was discontinued in 1873.

AMMUNITION

The powder and projectile were made into simple cartridges with combustible cases made of fabric, rendered waterproof and rigid by an application of varnish. These were crushed when seated home in the chamber by the action of the compound rammer.

PERCUSSION CAPS

Percussion caps, so called because of their shape, were made of two layers of copper foil with a minute quantity of fulminate of mercury, oxidizer, and a sustaining agent sandwiched between them. They were first introduced in this form in about 1822.



COLT NAVY MODEL 1861

Colt was a firm believer in standardization in manufacture. One of the factors that made Colt's pistols so sought-after was the interchangeablility of their components, which meant that replacements for broken parts could be bought off the shelf, and that improvements could be easily incorporated.

DATE	1861
ORIGIN	US
WEIGHT	2½ LB (1.2 KG)
BARREL	5½ IN (19.1 CM)
CALIBER	.36 IN

LEAD BULLETS

By 1861 the cylindro-ogival form had replaced the ball to become the standard shape for both rifle and pistol bullets. They were still being made from pure lead, without the addition of a hardening agent such as antimony.

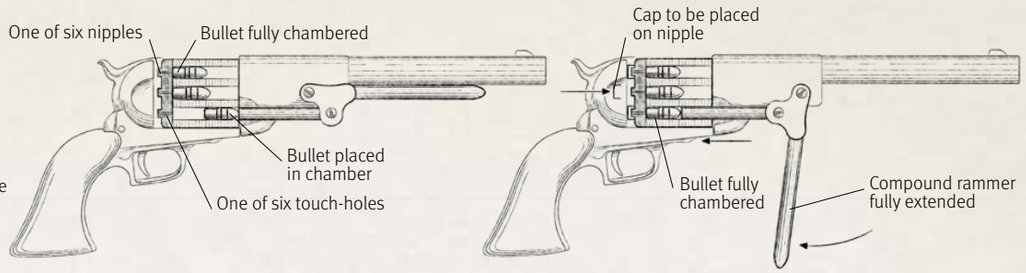
BULLET MOLD

Even though calibers had by now become standardized, it was still almost unheard-of to buy loose bullets. Instead, one bought a bar of lead and made one's own bullets, using the mold supplied with the pistol.

LOADING THE REVOLVER

HOW IT WORKS

The procedure for loading a percussion revolver was straightforward. A cartridge was placed into the chamber as far as it would go, in the six o'clock position, via the cutaway in the front of the frame. Alternatively, loose powder (from a flask with an angled spout) and a loose bullet could be inserted. The lever of the compound rammer was then lowered, pushing the rammer proper against the nose of the bullet and forcing it into the chamber, where the fragile casing of the cartridge was broken open. When all six chambers were loaded, a percussion cap was placed on each nipple in turn by way of the cutaway at the rear of the cylinder.



POWDER FLASK

By the 1860s, the traditional powder horn had given way to the flask, which incorporated a dispenser for a measured amount of powder as its spout. Most were ornamented with hunting or martial scenes.

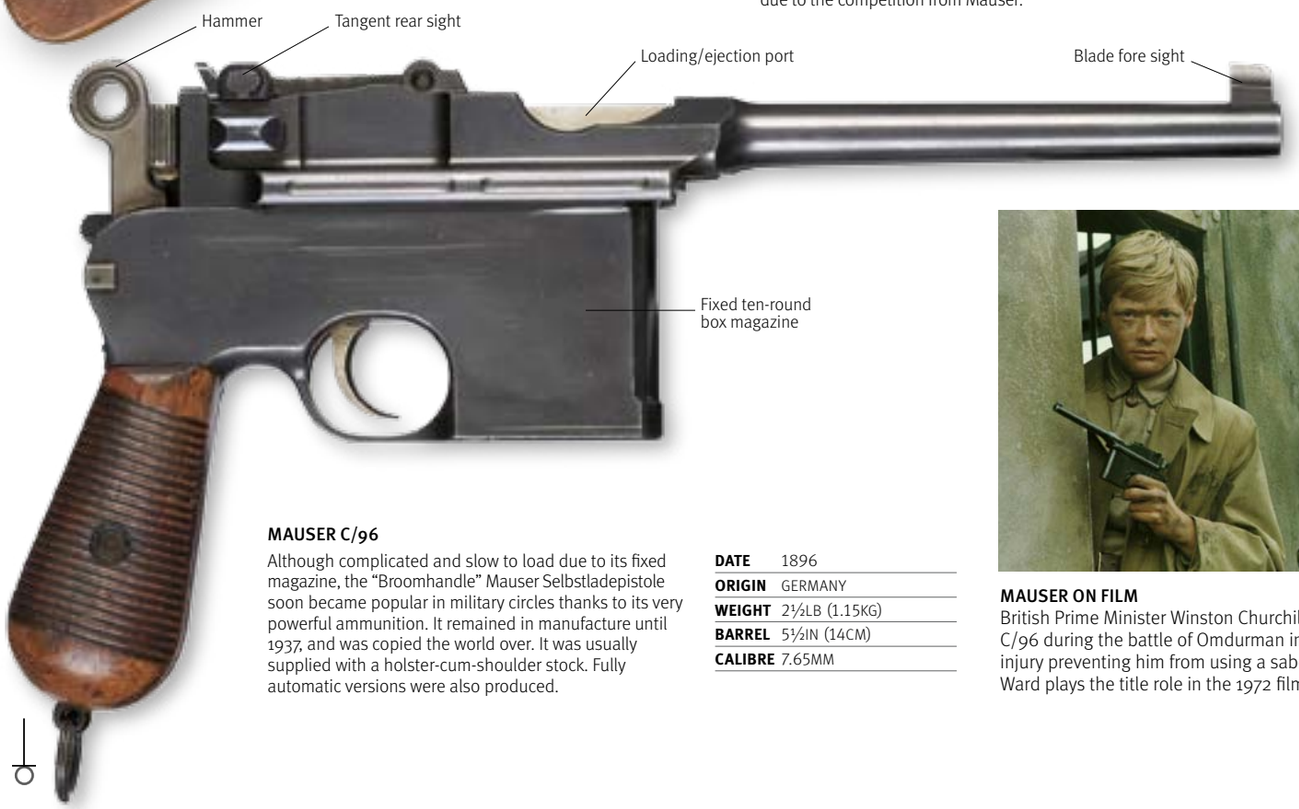
SELF-LOADING PISTOLS

THE GERMAN GUN MAKER AND ENGINEER Hugo Borchardt emigrated, in 1860, to the US, where he worked for Colt, Winchester, and other gun manufacturers. When he returned to his native Germany in 1892 to work for Waffenfabrik Loewe, the company was already producing Maxim guns, and that motivated him to experiment with a self-loading pistol. By 1893 he had produced a satisfactory if somewhat cumbersome design, and that in turn inspired others. By the end of the century, there were a dozen self-loading pistols on the market, all of which were designed and produced in Europe.

BORCHARDT C/93

In Borchardt's pioneering design, a toggle joint locks the bolt in place. Recoil forces the toggle to break upward, the bolt travels to the rear against a coil spring, and the spent case is ejected. Rebounding, the bolt picks up a fresh round, chambers it, and leaves the action cocked for the next shot. The gun was a commercial failure; only 3,000 were produced, and it was discontinued in 1898 due to the competition from Mauser.

DATE	1894
ORIGIN	GERMANY
WEIGHT	3¾LB (1.66KG)
BARREL	6½IN (16.5CM)
CALIBRE	7.63MM



MAUSER C/96

Although complicated and slow to load due to its fixed magazine, the "Broomhandle" Mauser Selbstladepistole soon became popular in military circles thanks to its very powerful ammunition. It remained in manufacture until 1937, and was copied the world over. It was usually supplied with a holster-cum-shoulder stock. Fully automatic versions were also produced.

DATE	1896
ORIGIN	GERMANY
WEIGHT	2½LB (1.15KG)
BARREL	5½IN (14CM)
CALIBRE	7.65MM

MAUSER ON FILM

British Prime Minister Winston Churchill carried a Mauser C/96 during the battle of Omdurman in 1898, a shoulder injury preventing him from using a saber. Here, Simon Ward plays the title role in the 1972 film *Young Winston*.

BROWNING MODEL 1900

John Moses Browning, probably the most prolific gun designer ever, moved to Belgium from his native USA in 1895. Here he produced an improved version of his first semi-automatic pistol – a simple, unlocked-breech, blowback design – that became known as the Model 1900. Small and light, it was hugely popular, and over 700,000 were sold before production ceased in 1911.

DATE	1900
ORIGIN	BELGIUM
WEIGHT	0.63KG (1½LB)
BARREL	10.2CM (4IN)
CALIBRE	7.65MM

GABBETT-FAIRFAX "MARS"

Perhaps inspired by the Mauser's success, Hugh Gabbett-Fairfax wanted to produce a super-powerful pistol; the result was the Mars. Described by users as "a nightmare," it was complex, awkward, and unwieldy, with a vicious recoil.

DATE	1898
ORIGIN	UK
WEIGHT	3½LB (1.55KG)
BARREL	11½IN (26.5CM)
CALIBRE	.45IN

BERGMANN NO.3

Theodore Bergmann's No.3 pistol was rather simplistic in design. The pistol was held in battery by a coiled spring, and the spent cartridge case was blown out of the breech by gas pressure.

DATE	1896
ORIGIN	GERMANY
WEIGHT	0.88KG (2LB)
BARREL	11.2CM (4½IN)
CALIBRE	6.5MM

WEBLEY-FOSBERY

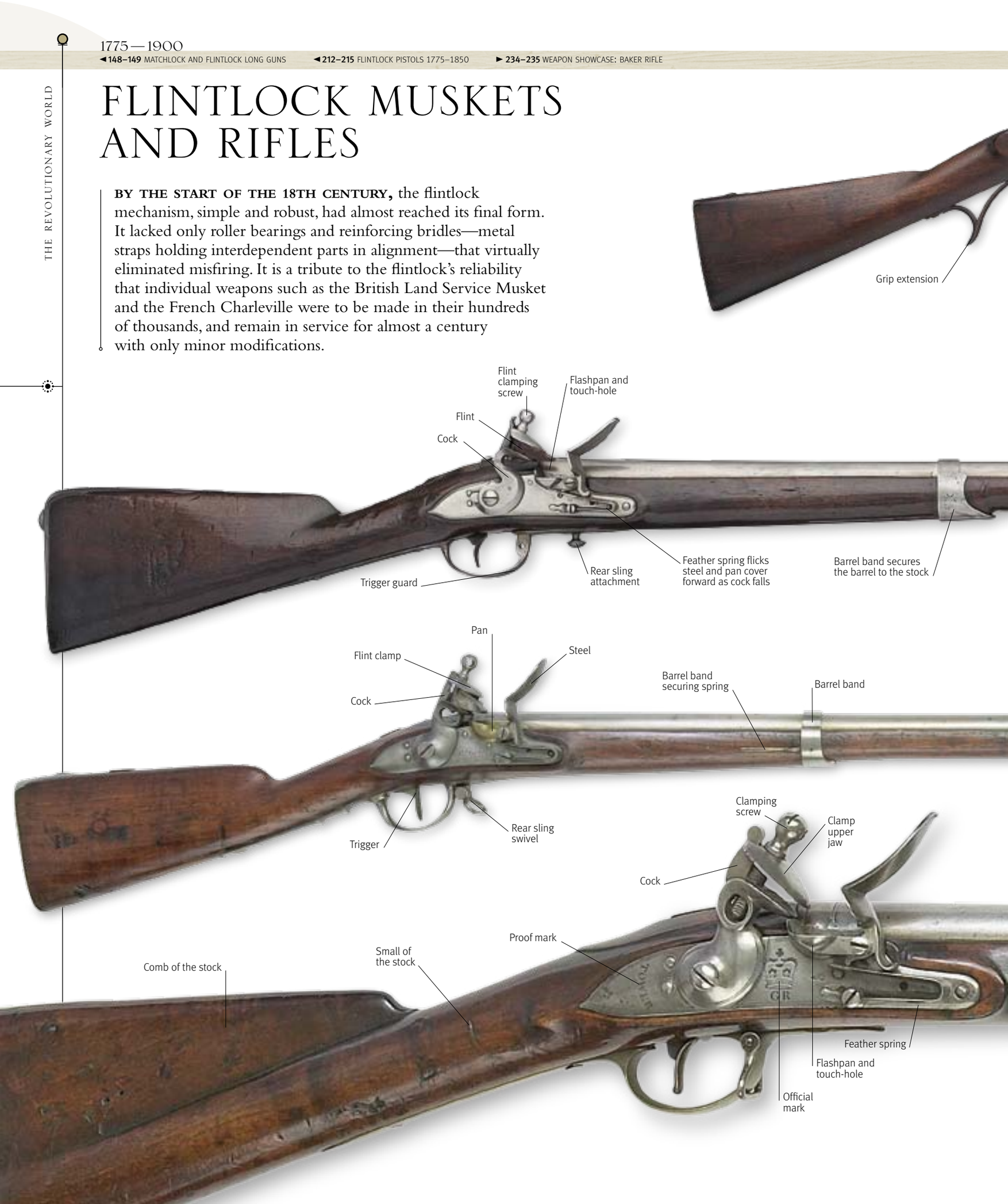
In 1899, Colonel George Fosbery designed a self-cocking revolver in which recoil propelled the barrel and cylinder backwards within a slide, indexing the cylinder. It proved too fragile for battlefield conditions.

DATE	1900
ORIGIN	UK
WEIGHT	2½LB (1.1KG)
BARREL	7½IN (19CM)
CALIBRE	.455IN

NAPOLEONIC WARS
Swords, bayonets, pistols, and muskets were widely used in the early 19th century for close fighting, with artillery and long-range rifles used to great effect over longer distances. The artillery caused most damage, with cannonballs being fired, and canisters and shells exploding near to, or amongst, the enemy's ranks.

FLINTLOCK MUSKETS AND RIFLES

BY THE START OF THE 18TH CENTURY, the flintlock mechanism, simple and robust, had almost reached its final form. It lacked only roller bearings and reinforcing bridles—metal straps holding interdependent parts in alignment—that virtually eliminated misfiring. It is a tribute to the flintlock's reliability that individual weapons such as the British Land Service Musket and the French Charleville were to be made in their hundreds of thousands, and remain in service for almost a century with only minor modifications.



HALL RIFLE

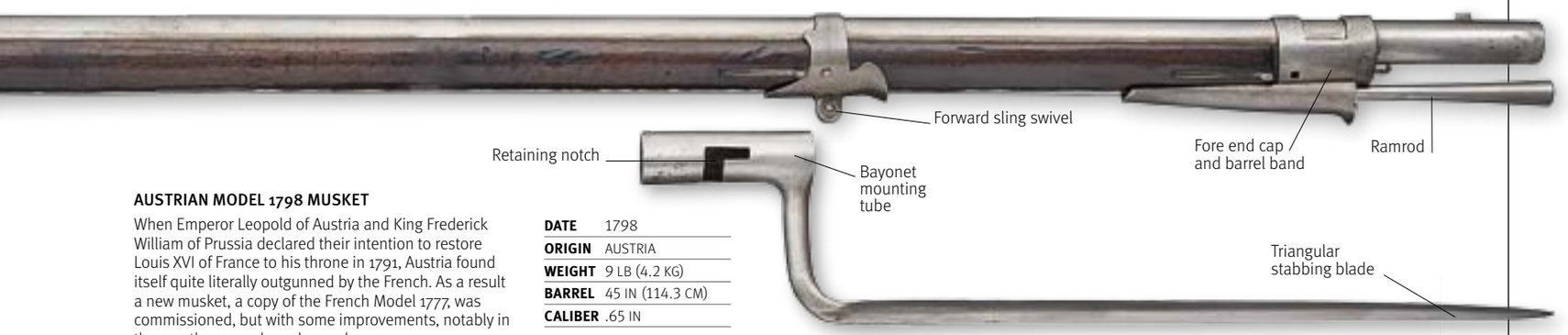
John Hancock Hall's rifle, designed in 1811 and introduced into service in 1819, was the first regulation American rifle to incorporate an opening breech; hinged at the front, it tipped up at a 30-degree angle for loading. Hall rifles and carbines were eventually produced in percussion form, too, when the entire breech unit could be removed and used as a pistol.

DATE	1819
ORIGIN	US
WEIGHT	10½ LB (4.68 KG)
BARREL	32½ IN (82.5 CM)
CALIBER	.54 IN

PRUSSIAN 1809-PATTERN MUSKET

The Prussian equivalent of the British Brown Bess or the French Charleville, the 1809-Pattern musket was made at the Potsdam Armoury in Berlin. Unlike its competitors it was furnished with a (brass) flash guard around the pan as standard, but in other respects it was similar. The majority of these flintlocks were converted to percussion.

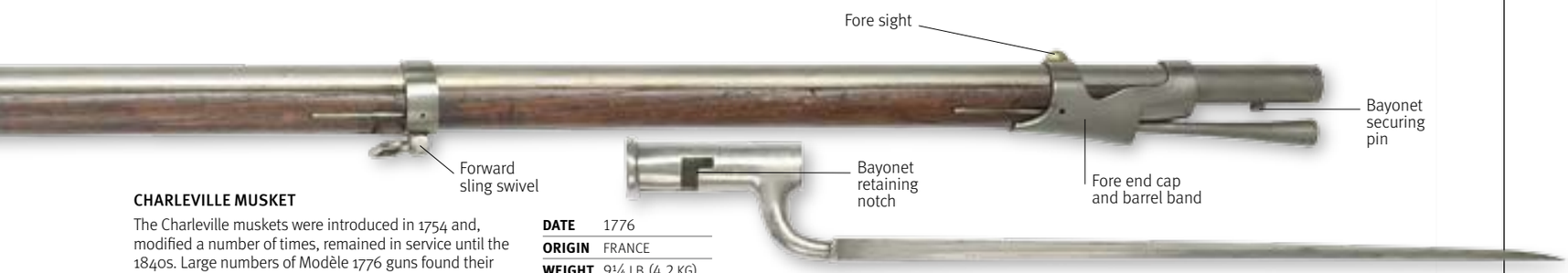
DATE	1809
ORIGIN	GERMANY
WEIGHT	8¾ LB (4 KG)
BARREL	41 IN (104.5 CM)
CALIBER	.75 IN



AUSTRIAN MODEL 1798 MUSKET

When Emperor Leopold of Austria and King Frederick William of Prussia declared their intention to restore Louis XVI of France to his throne in 1791, Austria found itself quite literally outgunned by the French. As a result a new musket, a copy of the French Model 1777, was commissioned, but with some improvements, notably in the way the ramrod was housed.

DATE	1798
ORIGIN	AUSTRIA
WEIGHT	9 LB (4.2 KG)
BARREL	45 IN (114.3 CM)
CALIBER	.65 IN



CHARLEVILLE MUSKET

The Charleville muskets were introduced in 1754 and, modified a number of times, remained in service until the 1840s. Large numbers of Modèle 1776 guns found their way to the US when a revised pattern was introduced the following year; they were the main armament of the Continental Army that defeated the British.

DATE	1776
ORIGIN	FRANCE
WEIGHT	9¼ LB (4.2 KG)
BARREL	44 IN (113.5 CM)
CALIBER	.65 IN

FULL VIEW

INDIA-PATTERN MUSKET

The Brown Bess in its final form differed from earlier models in the length of the barrel. It was reduced from 46 in (117 cm) to 42 in (106.5 cm) in the 1760s and finally to 39 in (99 cm). This modification was made for the East India Company and later adopted by the British Army which kept it in service until the 1840s.

DATE	1797 ONWARD
ORIGIN	UK
WEIGHT	9 LB (4.1 KG)
BARREL	39 IN (99 CM)
CALIBER	.75 IN

◄ 148–149 MATCHLOCK AND FLINTLOCK LONG GUNS ◄ 232–233 FLINTLOCK MUSKETS AND RIFLES

BAKER RIFLE

IN FEBRUARY 1800, the Baker rifle won a competition organized by the Army's Board of Ordnance and became the first rifle officially adopted by the British Army. It was similar to weapons in use in Germany, and its novel feature lay in its barrel. With shallow or "slow" rifling—just a quarter-turn in the length of the barrel—it stayed clean, and thus usable, for longer. It was issued to select men at first, and was superseded in 1838.

RIFLE

Ezekiel Baker's rifle was a robust weapon, designed to keep on working even under the most difficult conditions, and several modifications to the original design reflected that. With its short barrel (30 inches instead of the more customary 39) it was not particularly accurate, but was still a great improvement over the smooth-bore musket then in general use.

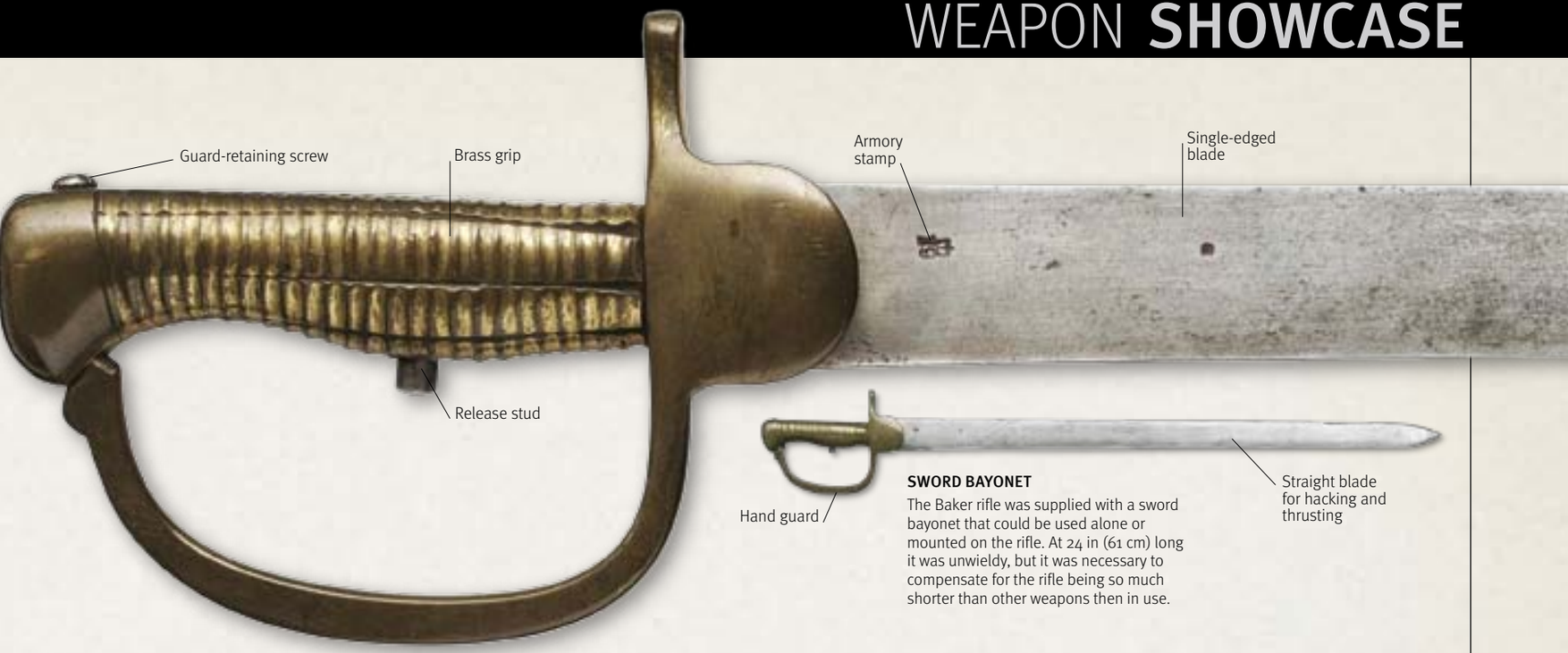
DATE	1802–37
ORIGIN	ENGLAND
WEIGHT	9 LB (4 KG)
BARREL	30 IN (76 CM)
CALIBER	.625 IN

RIFLEMAN OF THE 95TH REGIMENT

British rifle companies existed before the Baker was adopted, but a new regiment, the 95th (Rifle) Regiment, was raised specifically to exploit it. Dressed in green coats with black facings (and later known as the Green Jackets) they first saw action as marine infantry during the Battle of Copenhagen in 1801, but really came into their own during the Peninsular War of 1808–14.

MALLET

To begin with, small mallets were issued with Baker rifles, but were soon found to be unnecessary. Hand pressure alone was sufficient to ram down the ball.



SWORD BAYONET

The Baker rifle was supplied with a sword bayonet that could be used alone or mounted on the rifle. At 24 in (61 cm) long it was unwieldy, but it was necessary to compensate for the rifle being so much shorter than other weapons then in use.

RAMROD

The steel rod was used to ram the charge and projectile into the barrel.

PAPER-WRAPPED CARTRIDGE

These contained a charge of powder and the ball. They were torn open with the teeth, with the ball held in the mouth. A small portion of the charge was poured into the pan and the rest down the muzzle. The paper would then be rammed down to form a wad, and the ball, wrapped in a patch taken from the patchbox, rammed down on top.

PERCUSSION-CAP MUSKETS AND RIFLES

THE INVENTION, IN APPROXIMATELY 1820, of the fulminate of mercury percussion cap, revolutionized firearms, making them both simpler and more reliable. By the mid-19th century, all the world's armies had switched to the system, and were adopting the expanding bullet—developed by Norton and brought to its final form by James Burton—which allowed a muzzle-loading rifle to be charged as rapidly as a musket.

FULL VIEW

SPRINGFIELD MODEL 1855

The first regulation American percussion rifle was the Model 1841 Mississippi Rifle, with a 33-in (83.8-cm) barrel. It was later given a longer barrel and modified to use Maynard's patent tape primer fed from a roll housed inside the receiver (instead of individual copper caps placed over the nipple) and became the Model 1855.

DATE	1855
ORIGIN	US
WEIGHT	9½ LB (4.2 KG)
BARREL	40 IN (101.5 CM)
CALIBER	14.7 MM

SPRINGFIELD MODEL 1863 TYPE II

The Springfield M1855, with its tape primer system, was unsatisfactory and replaced by the M1861, which was itself not entirely free of faults; notably in the hammer and nipple. The Model 1863 saw the problems cured and other refinements made. The Type II was the last muzzle-loading weapon issued to the United States army.

DATE	1863
ORIGIN	US
WEIGHT	9½ LB (4.3 KG)
BARREL	40 IN (101.5 CM)
CALIBER	.58 IN

FUSIL REGLEMENTAIRE MLE 1853

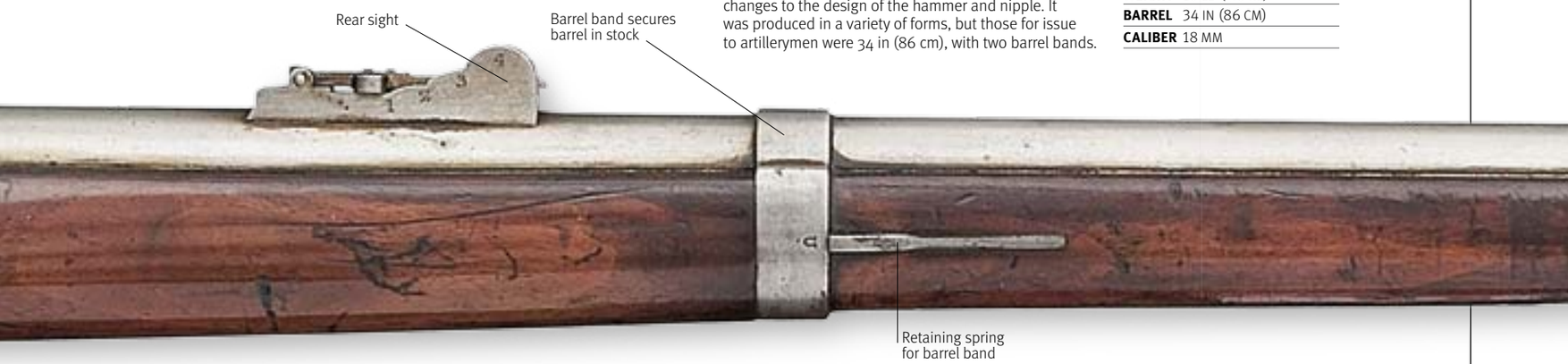
By the 1840s, steel had come to replace iron in the production of gun barrels. It was found to rust more easily, and a surface treatment known as blueing was introduced. Proof (i.e. prototype) weapons, like this one and the Modèle 1842, not intended for issue to troops, were often left unblued, and are said to be "in the bright."

DATE	1853
ORIGIN	FRANCE
WEIGHT	9¼ LB (4.25 KG)
BARREL	40½ IN (103 CM)
CALIBER	18 MM

MOUSQUETON D'ARTILLERIE MLE 1842

First issued to the French Army 20 years earlier and subsequently modified to percussion ignition, the Modèle 1842 received improved rifling and detail changes to the design of the hammer and nipple. It was produced in a variety of forms, but those for issue to artillerymen were 34 in (86 cm), with two barrel bands.

DATE	1843
ORIGIN	FRANCE
WEIGHT	10 LB (4.6 KG)
BARREL	34 IN (86 CM)
CALIBER	18 MM



WHITWORTH RIFLE

Sir Joseph Whitworth (who was best known for standardizing screw threads) produced a rifle for a British Army trial, with an hexagonal bore, which fired an hexagonal bullet. It proved to be accurate to well over 1,500 yards (1.4 km), but it was four times the price of an Enfield Model 1853, and never adopted by the army.

DATE	1856
ORIGIN	UK
WEIGHT	10 LB (4.55 KG)
BARREL	36 IN (91.45 CM)
CALIBER	.45 IN

LE PAGE SPORT GUN

PIERRE LE PAGE set up in business as *arquebusier* in Paris, perhaps as early as 1716, and was later appointed gun maker to the king. He was succeeded by his nephew Jean in 1782, who was retained by the Emperor Napoleon to refurbish weapons from the royal gun-room for his own use. Jean's son Henri took over the firm in 1822, by which time Napoleon had died in exile on St. Helena. This sport gun was made to commemorate the return of his ashes to France in 1840.

LE PAGE SPORT GUN

While the technical quality of the gun is excellent, its appeal lies in its decoration. The scrollwork on the small of the stock is enhanced with steel wire, while the metalwork is engraved with scenes from Napoleon's life and the names of some of his battles.

DATE	1840
ORIGIN	FRANCE
WEIGHT	11LB (5KG)
BARREL	31½IN (80CM)
CALIBRE	8-BORE

WAD PUNCH

Wadding, usually made of paper, was rammed into the barrels after the powder but before the bullets. As it was essential that the wads precisely fitted the barrels, a wad cutter was included with the gun's tools.

BULLET MOULD

A percussion sport gun could be loaded with pellets, for use against birds and wildfowl, but also with balls for use against large game. This mold was used to make such balls.

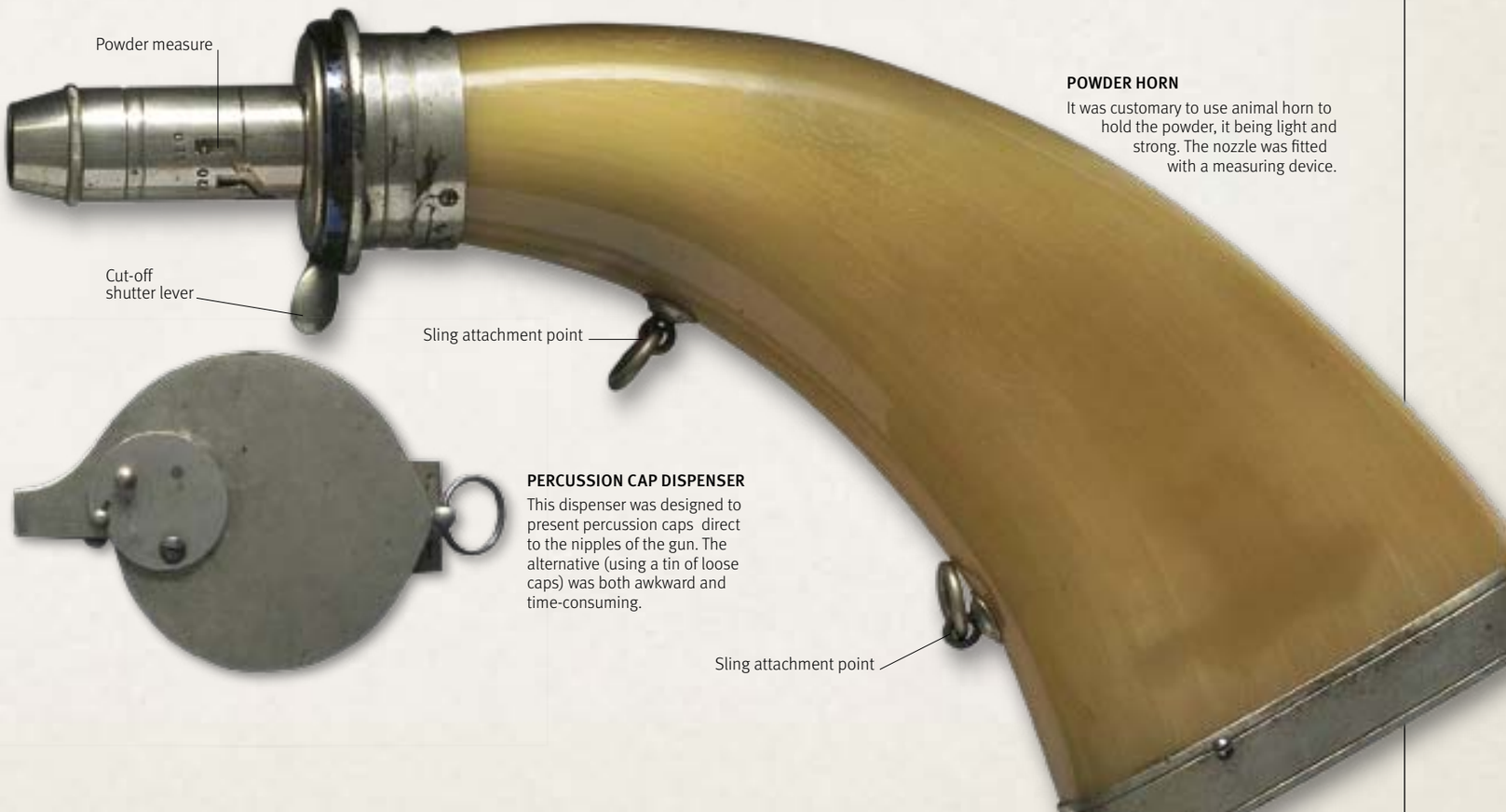
HAMMER HEAD

Clenched in the hand, this was applied to the ramrod to assist with seating the balls in the barrels.

RAMROD

The gun's ramrod doubled as a cleaning rod, and could be fitted with a "worm" to allow a dud charge to be drawn.

TOP VIEW OF BARREL



POWDER HORN

It was customary to use animal horn to hold the powder, it being light and strong. The nozzle was fitted with a measuring device.

PERCUSSION CAP DISPENSER

This dispenser was designed to present percussion caps direct to the nipples of the gun. The alternative (using a tin of loose caps) was both awkward and time-consuming.

PERCUSSION CAP BREECH LOADERS

19TH-CENTURY GUNMAKERS used ingenious methods to solve the problem of obturation—making an opening breech gas-tight. Though obturation would not be reliably achieved until the advent of the brass cartridge, some makers were successful enough that their guns found a sizeable market. Carbines were particularly popular among horsemen, because they were easier to manage, and breech loaders—in theory —could be reloaded in the saddle.

SHARPS CARBINE

Christian Sharps devised his breech-loading system in 1848. Pulling the trigger guard down and forward opened the breech, and the breech-block sheared off the rear portion of the linen cartridge as it closed. During the American Civil War, the Union Army bought over 80,000 Sharps' carbines for its cavalry regiments. This rare slant-breech version from 1852 uses a Maynard tape primer.

DATE	1848
ORIGIN	US
WEIGHT	7¾ LB (3.5 KG)
BARREL	18 IN (45.5 CM)
CALIBER	.52 IN

TERRY BOLT-ACTION CARBINE

The Terry carbine was the first bolt-action weapon adopted by the British Army. Its paper cartridge included a greased felt wad, which remained in the breech after firing and was pushed into the barrel by the insertion of the next round, lubricating and cleaning the bore when it was fired. In a trial, one carbine fired 1,800 rounds without requiring additional cleaning.

DATE	1861
ORIGIN	UK
WEIGHT	7 LB (3.21 KG)
BARREL	20.13 IN (51.2 CM)
CALIBER	.54 IN

WESTLEY RICHARDS "MONKEY TAIL" CARBINE

Eminent Birmingham gunmakers, Westley Richards & Co. produced two types of carbine for the British Army. One had a falling-block action, the other (illustrated) had a front-hinged tilting breech with a long, curved actuating lever, which gave the weapon its nickname. Westley Richards' carbines required the percussion cap to be located at the mid-point of the cartridge.

DATE	1866
ORIGIN	UK
WEIGHT	6½ LB (3 KG)
BARREL	19 IN (45.5 CM)
CALIBER	.45 IN

CHASSEPOT PERCUSSION CARBINE

In the mid-1850s, gunmakers at the French Imperial Armories began experimenting with bolt-action, percussion cap breech loaders. Alphonse Chassepot produced a design using a rubber washer to seal the breech. He subsequently replaced the hammer with a needle striker within the bolt, which was accepted for use by the French Army as the Modèle 1866.

DATE	1858
ORIGIN	FRANCE
WEIGHT	6¾ LB (3.03 KG)
BARREL	28 IN (72 CM)
CALIBER	13.5 MM

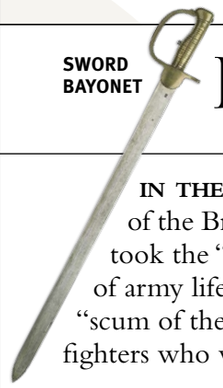
GREENE CARBINE

The Greene carbine, produced in small numbers for the British Army during the Crimean War, lost out to its rivals due to its cumbersome mechanism. The barrel had to be rotated through a quarter-turn: this unlocked the breech, which was then free to swing out so that a new cartridge could be introduced. The carbine used Maynard's tape primer system, rather than individual percussion caps.

DATE	1855
ORIGIN	US
WEIGHT	3½ LB (3.4 KG)
BARREL	56 CM (22 IN)
CALIBER	.54 IN

CUSTER'S LAST STAND

First used in the Civil War and then in the Indian Wars, the Sharps carbine was favored by US cavalrymen. However, its use at Little Bighorn against the Sioux and Cheyenne Indians could not prevent the defeat of the Seventh Cavalry.



SWORD
BAYONET

BRITISH REDCOAT

IN THE ERA OF musket-and-bayonet warfare, red-coated infantry formed the core of the British regular army. Recruited from the poor, landless, and unemployed, they took the "king's shilling" after being plied with drink, or tempted by the glamour of army life, or even as an alternative to imprisonment for petty crime. Yet these "scum of the earth," as the Duke of Wellington called them, were turned into resolute fighters who won many victories, notably over the French in the Napoleonic Wars.

DRILL AND DISCIPLINE

The Redcoat infantry were trained to fight as a unit, giving unhesitating obedience to orders and suppressing individual initiative. This was achieved through relentless drill, brutal discipline—with extensive use of flogging—and the cultivation of loyalty to the soldier's regiment and his colleagues. The emphasis on drill and discipline was essential given the weapons and tactics of the period. The key British infantry arm, the Brown Bess musket, was wildly inaccurate and thus effective only if infantry were trained to fire in volleys. They had to learn to form lines or squares on the battlefield—the latter to resist cavalry—to advance unarmored into musket fire, or stand firm under artillery bombardment. Holding steady was the surest way to avoid casualties, presenting an unbroken line of bayonets as the last line of defense. The bright red coat made sense on battlefields where men had to identify friend and foe through the thick smoke of gunpowder.

BATTLE OF WATERLOO
British infantry squares fight off French cavalry in the last battle of the Napoleonic Wars at Waterloo in June 1815. Ably led by the Duke of Wellington, British soldiers proved a match for Napoleon's forces throughout the later stages of the war, showing discipline and steadiness under fire.

"THEY WERE COMPLETELY BEATEN...BUT THEY DID NOT KNOW IT AND WOULD NOT RUN."

MARSHAL SOULT AFTER BATTLE OF ALBUERA, MAY 1811

TOOLS OF COMBAT

BATTLE OF YORKTOWN
A 19th-century painting shows British infantry engaging the American rebels at bayonet-point in the outer redoubts of Yorktown in 1781. Surrender to the Americans and their French allies at Yorktown brought the American War of Independence to a humiliating conclusion for British forces.

SWORD BAYONET FOR BAKER RIFLE

PAPER-WRAPPED BAKER RIFLE CARTRIDGE

BAYONET FOR BROWN BESS MUSKET

BROWN BESS MUSKET

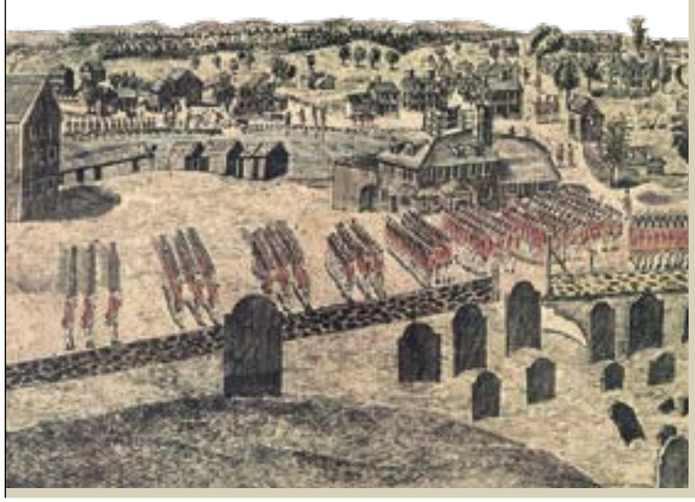
BAKER RIFLE

REDCOAT UNIFORM
This British infantryman wears early 19th-century uniform. The shako replaced the tricorne hat in 1801–02. By 1815 breeches and gaiters had been replaced by trousers and the "stovepipe" hat had given way to the "Belgic" shako with false front.

LEXINGTON AND CONCORD

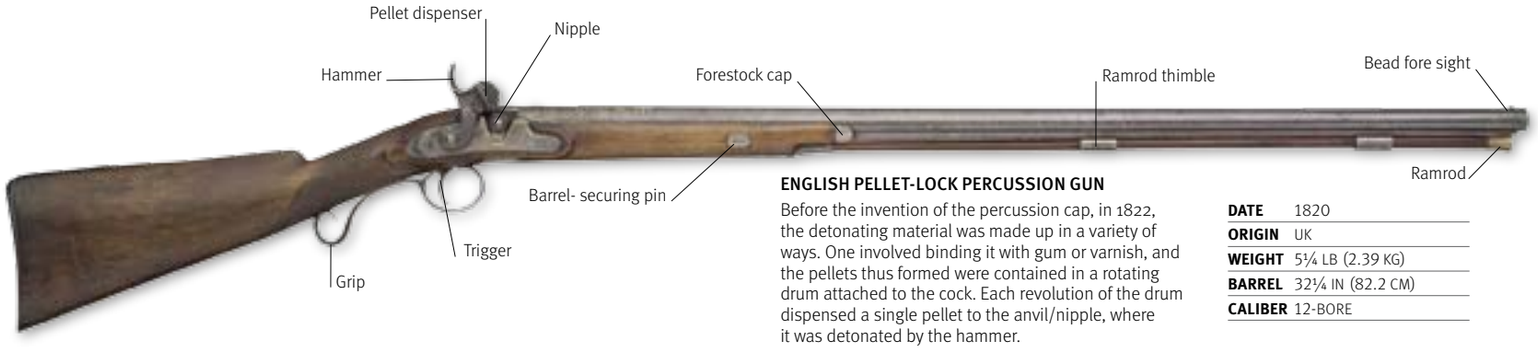
At the outset of the American War of Independence, in Massachusetts in April 1775, British Redcoats were sent from Boston and Charleston to seize the arms and gunpowder of rebel Minutemen militia at Concord. There was an initial confrontation with militia at Lexington, in which eight Minutemen were killed. When the British reached Concord, they met stiff resistance. Obliged to retreat, the Redcoats were harassed by American snipers with rifles, using guerrilla tactics for which the British were unprepared. British losses numbered 273, compared with 95 on the Massachusetts rebel side. The encounter showed Redcoats at their worst. Trained to fight standing up in the open against European armies employing identical tactics, they were wrong-footed by opponents who used trees for cover and fired aimed shots instead of volleys.

BRITISH TROOPS MARCH ON CONCORD



SPORT GUNS

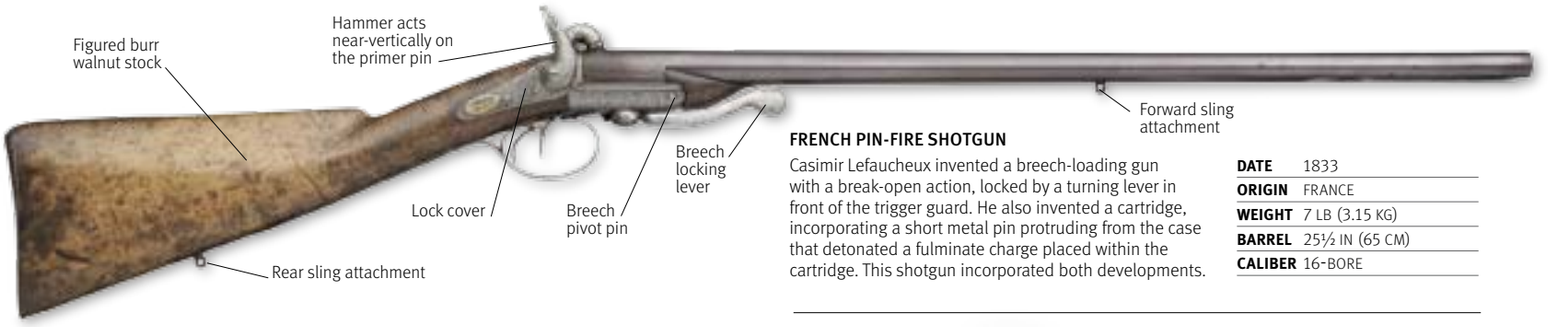
THE 19TH CENTURY WAS CHARACTERIZED by innovation and invention in many fields, and the gunmaker's trade was no exception. At the start of the period, even the most ordinary of guns had to be handcrafted from scratch, making them very expensive, not just to produce, but also to repair. Long before the end of the century, however, the majority of guns were being produced *en masse*, which not only made them more affordable, but brought to them the quality and reliability previously found only in the most prestigious guns.



ENGLISH PELLET-LOCK PERCUSSION GUN

Before the invention of the percussion cap, in 1822, the detonating material was made up in a variety of ways. One involved binding it with gum or varnish, and the pellets thus formed were contained in a rotating drum attached to the cock. Each revolution of the drum dispensed a single pellet to the anvil/nipple, where it was detonated by the hammer.

DATE	1820
ORIGIN	UK
WEIGHT	5¼ LB (2.39 KG)
BARREL	32¼ IN (82.2 CM)
CALIBER	12-BORE



FRENCH PIN-FIRE SHOTGUN

Casimir Lefaucheux invented a breech-loading gun with a break-open action, locked by a turning lever in front of the trigger guard. He also invented a cartridge, incorporating a short metal pin protruding from the case that detonated a fulminate charge placed within the cartridge. This shotgun incorporated both developments.

DATE	1833
ORIGIN	FRANCE
WEIGHT	7 LB (3.15 KG)
BARREL	25½ IN (65 CM)
CALIBER	16-BORE

GERMAN BREAK-OPEN DOUBLE RIFLE

Even after the perfection of the bolt-action magazine rifle, there were those who refused to embrace the new technology. Hunters, particularly of big and dangerous game, preferred to trust the simplicity of a break-open double-barreled design.

DATE	1880
ORIGIN	GERMANY
WEIGHT	7½ LB (3.43 KG)
BARREL	25½ IN (65 CM)
CALIBER	.45 IN

GERMAN BOLT-ACTION SPORTER

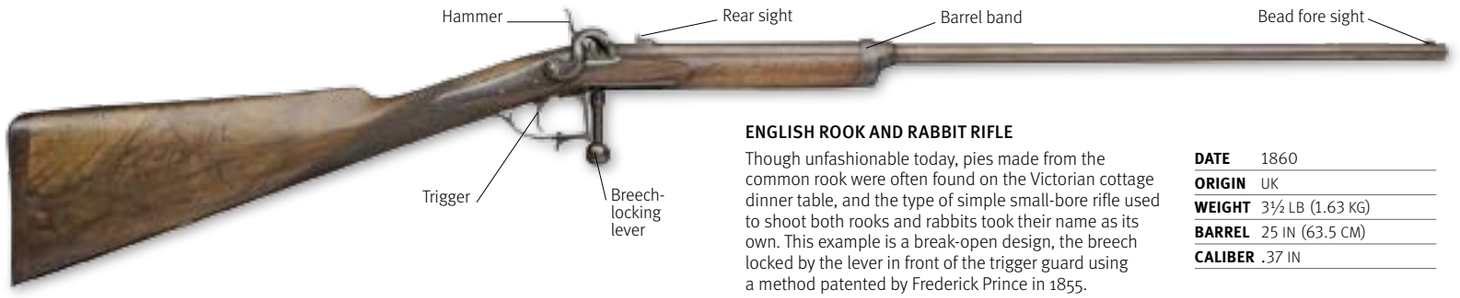
Waffenfabrik Mauser came to dominate the world market for bolt-action rifles for both civilian and military applications, and its hunting rifles set the standard for the type. This rifle employs the action of the Model 1888 infantry rifle as modified for the carbine, with the flattened, turned-down bolt handle. The five-round magazine is of the pattern developed by Mannlicher.

DATE	1890
ORIGIN	GERMANY
WEIGHT	7 LB (3.2 KG)
BARREL	25 IN (63.5 CM)
CALIBER	7.9 MM x 57

COLT PATTERSON REVOLVING RIFLE

Samuel Colt was awarded his first patent, for a six-shot revolver pistol, in London in October 1835, and set up his first factory, in Patterson, New Jersey. As well as pistols, he began turning out revolver rifles, but his facilities were limited and he soon went bankrupt. Patterson-built Colts, such as this first-pattern concealed-hammer eight-shot rifle, are extremely rare.

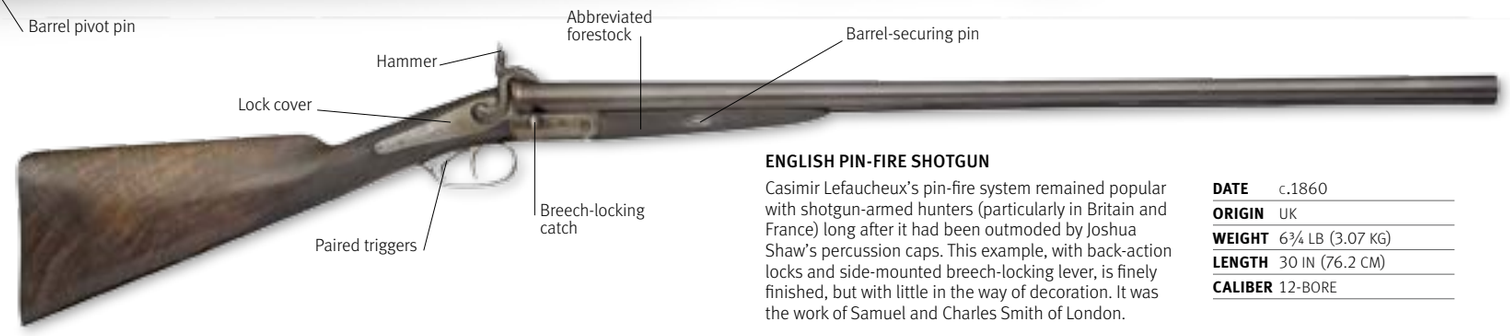
DATE	1837
ORIGIN	US
WEIGHT	8½ LB (3.9 KG)
BARREL	32 IN (81.3 CM)
CALIBER	.36 IN



ENGLISH ROOK AND RABBIT RIFLE

Though unfashionable today, pies made from the common rook were often found on the Victorian cottage dinner table, and the type of simple small-bore rifle used to shoot both rooks and rabbits took their name as its own. This example is a break-open design, the breech locked by the lever in front of the trigger guard using a method patented by Frederick Prince in 1855.

DATE	1860
ORIGIN	UK
WEIGHT	3½ LB (1.63 KG)
BARREL	25 IN (63.5 CM)
CALIBER	.37 IN



ENGLISH PIN-FIRE SHOTGUN

Casimir Lefaucheux's pin-fire system remained popular with shotgun-armed hunters (particularly in Britain and France) long after it had been outmoded by Joshua Shaw's percussion caps. This example, with back-action locks and side-mounted breech-locking lever, is finely finished, but with little in the way of decoration. It was the work of Samuel and Charles Smith of London.

DATE	c.1860
ORIGIN	UK
WEIGHT	6¾ LB (3.07 KG)
LENGTH	30 IN (76.2 CM)
CALIBER	12-BORE

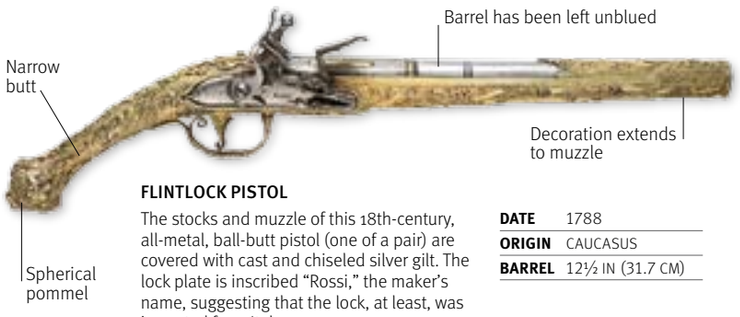
OTTOMAN EMPIRE FIREARMS

BY THE END OF THE 17TH CENTURY, the Ottoman Empire stretched from Constantinople (Istanbul), its capital, through the Balkans to modern-day Austria, across North Africa almost to the Straits of Gibraltar, north into Russia, east almost to the Straits of Hormuz, and south to the Sudan. Conquering and controlling such a vast area required military acumen and also the most modern weapons, so Ottoman gunmaking flourished from an early date. Many of the surviving pieces are, broadly speaking, sumptuously decorated copies of European designs, although some Ottoman *tüfenk* (muskets) resemble Indian designs.

FLINTLOCK PISTOL

A pistol such as this—stocked all the way to the muzzle, with its woodwork copiously inlaid, and its lock, barrel, and trigger guard decorated with silver and gold—would have graced any arms cabinet in the Ottoman world. The lock appears to be of European pattern.

DATE LATE 18TH CENTURY
ORIGIN TURKEY



FLINTLOCK PISTOL

The stocks and muzzle of this 18th-century, all-metal, ball-butt pistol (one of a pair) are covered with cast and chiseled silver gilt. The lock plate is inscribed "Rossi," the maker's name, suggesting that the lock, at least, was imported from Italy.

DATE 1788
ORIGIN CAUCASUS
BARREL 12½ IN (31.7 CM)

FLINTLOCK PISTOL

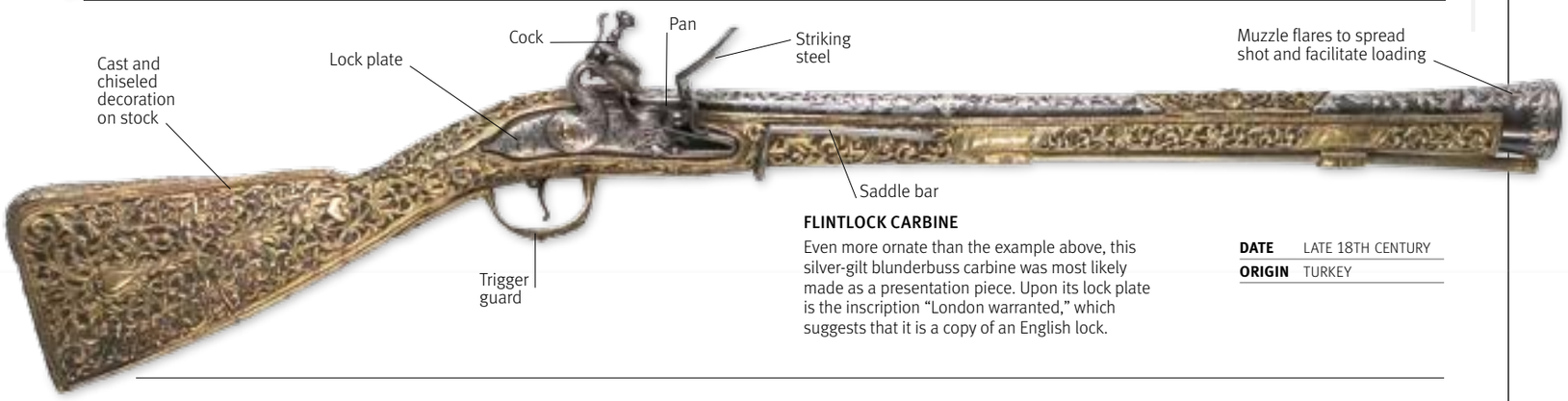
With the gentle fall to the butt and the slim "lemon" pommel, this pistol is reminiscent of European pieces of a century or more earlier. This flintlock also displays the common trademark of Ottoman gunmakers: gilded decoration surrounding the muzzle.

DATE 18TH CENTURY
ORIGIN TURKEY

FLINTLOCK CARBINE

Despite its being furnished with a shoulder stock that is incised, carved, and inlaid with silver, this blunderbuss is actually a large horse pistol. The work of "the Dervish Amrullah," according to an engraved inscription, it was clearly made for use by a cavalryman, as it has a bar and ring for suspension from a saddle.

DATE	EARLY 18TH CENTURY
ORIGIN	TURKEY
BARREL	13½ IN (34.3 CM)



FLINTLOCK CARBINE

Even more ornate than the example above, this silver-gilt blunderbuss carbine was most likely made as a presentation piece. Upon its lock plate is the inscription "London warranted," which suggests that it is a copy of an English lock.

DATE	LATE 18TH CENTURY
ORIGIN	TURKEY

SNAPHAUNCE TÜFENK

This smooth-bore musket, or *tüfenk*, is very similar both in overall form and the manner of its decoration to muskets produced in northern India. The pentagonal-section butt stock terminates at the breech in a pronounced prawl. The barrel is octagonal in section, and the lock is a snaphaunce, which had become obsolete in the west by the early 17th century.

DATE	LATE 18TH CENTURY
ORIGIN	TURKEY
BARREL	28½ IN (72.4 CM)

FULL VIEW

BALKAN MIQUELET TÜFENK

Like the snaphaunce *tüfenk* above, this early 19th-century piece is reminiscent of Indian muskets. The stock is entirely covered in ivory and further embellished with inlays of precious stones and brass. The miquelet lock, common in Spain and Italy, is thought to have made its way to the Ottoman Empire via North Africa.

DATE	EARLY 19TH CENTURY
ORIGIN	TURKEY
BARREL	114.3CM (45IN)

SINGLE-SHOT BREECH-LOADING RIFLES

AFTER THE INTRODUCTION of unitary cartridges, which could be loaded by way of the breech, the challenge to gun makers was to develop a gas-tight seal. In the event, the bolt action—as pioneered by von Dreyse and Antoine Chassepot and perfected by the Mauser brothers—was to win out, but in the interim, a variety of other solutions was trialed, some of them conversions, others, such as the Martini-Henry and the Remington Rolling Block, purpose-designed.

THE BATTLE OF KÖNIGGRÄTZ
At the battle of Königgrätz (Sadowa), on July 3, 1866, thanks largely to the superior firepower of its Dreyse needle guns over the muzzle-loaders of the rival Austrians, Prussia was victorious, and went on to become the dominant force in Central Europe.

MAUSER M/71

Waffenfabrik Mauser began modifying Dreyse guns to accept brass cartridges, but Peter Paul Mauser produced a new design, strong enough to handle much more powerful ammunition and effective out to a range of 0.5 miles (800 m). The Infanteriegewehr M/71 established Mauser's pre-eminence among suppliers of military rifles.

DATE	1872 ONWARD
ORIGIN	GERMANY
WEIGHT	10 LB (4.5 KG)
BARREL	32 IN (83 CM)
CALIBER	11 MM

DREYSE NEEDLE GUN, MODEL 1841

Dreyse produced a rifle with a simple turn-down bolt, terminating in a needle that penetrated the length of a (linen) cartridge to detonate a percussion cap in the base of a Minié bullet. The advent of the brass cartridge made the rifle obsolete, but still the Prussians used it to defeat the French in the Franco-German War in 1871.

DATE	1841
ORIGIN	PRUSSIA
WEIGHT	10 LB (4.5 KG)
BARREL	27 IN (70 CM)
CALIBER	13.6 MM

SPRINGFIELD TRAPDOOR

The perfection of the unitary cartridge left the world's armies with a dilemma: what to do with their millions of redundant muzzle-loaders. The US Army modified their rifled muskets by milling out the top of the barrel, creating a chamber for the cartridge, and installing a front-hinged breech cover incorporating a firing pin.

DATE	1874
ORIGIN	US
WEIGHT	10 LB (4.5 KG)
BARREL	32 IN (82.5 CM)
CALIBER	.45 IN

MARTINI-HENRY MK 1

The British Army's first purpose-designed breech-loading rifle, the Martini-Henry, incorporated a falling breech-block; lowering the under-lever opened the breech, and returning it both closed it and cocked the action. A skilled man could fire 20 aimed shots per minute.

DATE	1871
ORIGIN	UK
WEIGHT	10 LB (4.5 KG)
BARREL	33 IN (85 CM)
CALIBER	.45 MARTINI

REMINGTON ROLLING BLOCK

Remington's purpose-designed breech-loader struggled to find a market at home, despite having been declared the best rifle in the world at the 1868 Imperial Exposition in Paris. The rifle's rolling-block action, first introduced in 1863, was not as smooth in use as the falling breech-block of the Martini-Henry.

DATE	c.1890
ORIGIN	EGYPT
WEIGHT	9 LB (4 KG)
BARREL	35 IN (89.6 CM)
CALIBER	.45 IN

ENFIELD RIFLE-MUSKET

WITH THE PERFECTION of the expanding bullet, it became possible to issue rifles to all troops, not just to sharpshooters, for they could now be loaded as fast as a musket. The British Army adopted one such rifle in 1851, but it proved unsatisfactory; its replacement, produced by the Ordnance Factory at Enfield, was adopted in 1853. It remained in service until 1867, when work began on converting the rifles to breech-loaders, using the method devised by Jacob Snider of America. For all its apparent simplicity, the Pattern 1853 Rifle-Musket has a total of 56 parts.

Packet of ten cartridges

FULL VIEW

Hammer

AMMUNITION

The Pattern 1853 Rifle-Musket was loaded with 2½ drams (4.43g) of black powder and a 530-grain (34.35g) bullet of .568in caliber, which expanded to take the rifling of the barrel, which was .577in in diameter. Charge and ball were packed into cartridges and issued in packets of ten, with a dozen percussion caps.

Lock cover plate bears maker's name and insignia

Nipple pierced to allow flash from cap to enter breech

Small of stock fits hand

Attachment point for sling

Trigger

PATTERN 1853 RIFLE-MUSKET

The rifle-musket was a highly successful weapon. In the hands of a competent infantryman it was effective beyond its sighted distance (820m/2,700ft), and at 90m (300ft) the bullet could pass through a dozen 1.5cm (½in) planks. A soldier was expected to maintain a firing rate of three to four rounds per minute.

DATE	1853
ORIGIN	UK
WEIGHT	4.05KG (9LB)
BARREL	83.8CM (33IN)
CALIBRE	.577IN

Socket fits over muzzle

BAYONET

The socket bayonet, with its triangular-section blade, protruded almost 46cm (18in) beyond the muzzle. It alone required 44 separate manufacturing operations.

Triangular-section blade

COMBINATION TOOL

The combination tool included everything needed to care for the rifle in the field, including appropriately sized screwdrivers and spanners, and a pricker for the nipple. Also shown are accessories for the ramrod.

RAMROD

As well as being used to ram wadded cartridge paper onto the charge and ball, the ramrod served as a cleaning rod. It was threaded to take the double-helix "worm" used to extract dud charges.

CARTRIDGES

The cartridges were dipped in wax to lubricate the bore. Rumours that it was pig or cow fat was offensive to both Hindu and Muslim soldiers, who were forbidden to eat beef or pork respectively; this is one suggested cause of the Indian Mutiny of 1857.

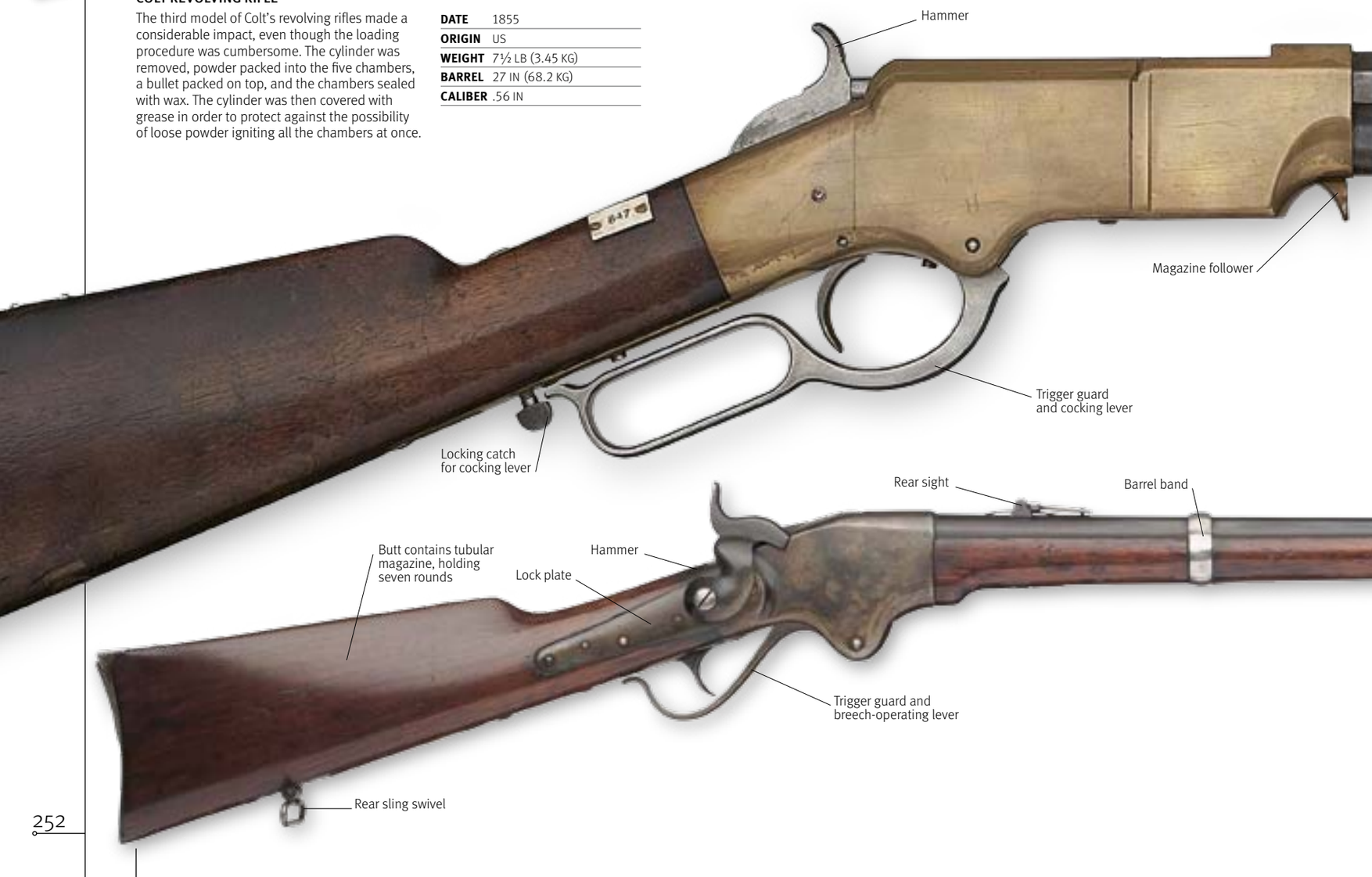
MANUALLY LOADED REPEATER RIFLES 1855–1880

THERE HAD BEEN ATTEMPTS to produce repeater rifles and muskets as early as the 16th century. Notwithstanding the success enjoyed by the "cap-and-ball" revolvers of Colt and others, it took the unitary cartridge containing priming, charge, and projectile in one package to make the repeater rifle a satisfactory reality. The breakthrough came midway through the 19th century, and within a decade repeating rifles had become commonplace. Contained in magazines, their ammunition was fed to the breech as part of the single action that cleared the chamber of a spent cartridge case, cocked the action, and readied the gun for firing.

COLT REVOLVING RIFLE

The third model of Colt's revolving rifles made a considerable impact, even though the loading procedure was cumbersome. The cylinder was removed, powder packed into the five chambers, a bullet packed on top, and the chambers sealed with wax. The cylinder was then covered with grease in order to protect against the possibility of loose powder igniting all the chambers at once.

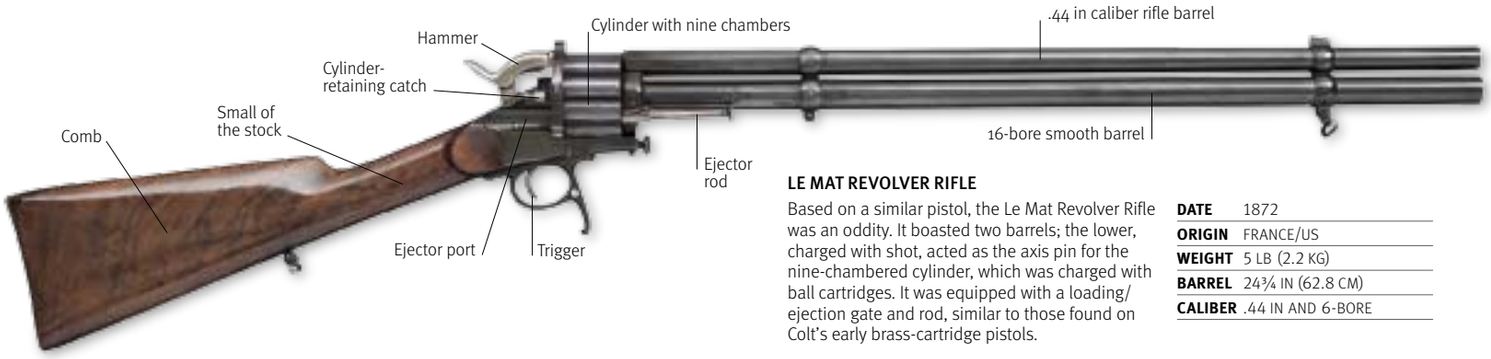
DATE	1855
ORIGIN	US
WEIGHT	7½ LB (3.45 KG)
BARREL	27 IN (68.2 KG)
CALIBER	.56 IN



WINCHESTER MODEL 1866 CARBINE

The principle shortcoming of Benjamin Tyler Henry's underlever rifle lay in the way its tubular magazine was charged. In 1866, Nelson King, Henry's successor, introduced an improvement that allowed reloading, even of a part-full magazine, via a port on the receiver. This doubled the rifle's rate of fire to 30 rounds a minute.

DATE	1866
ORIGIN	US
WEIGHT	9¼ LB (4.2 KG)
BARREL	23 IN (58½ CM)
CALIBER	.44 RIMFIRE



LE MAT REVOLVER RIFLE

Based on a similar pistol, the Le Mat Revolver Rifle was an oddity. It boasted two barrels; the lower, charged with shot, acted as the axis pin for the nine-chambered cylinder, which was charged with ball cartridges. It was equipped with a loading/ejection gate and rod, similar to those found on Colt's early brass-cartridge pistols.

DATE	1872
ORIGIN	FRANCE/US
WEIGHT	5 LB (2.2 KG)
BARREL	24¾ IN (62.8 CM)
CALIBER	.44 IN AND 6-BORE

HENRY MODEL 1860

When Oliver Winchester set up the New Haven Arms Co., he brought in Tyler Henry to run it. Henry's first act was to design a repeating rifle worked by an underlever that ejected the spent round, chambered a new one, and left the action cocked. To lock the action, he used a two-piece bolt joined by a toggle-joint. This same method was later used by Maxim in his machine gun, and by Borchardt and Luger in their pistols.

DATE	1862
ORIGIN	US
WEIGHT	9 LB (4 KG)
BARREL	20 IN (51 CM)
CALIBER	.44 IN RIMFIRE

FULL VIEW

SPENCER RIFLE

Christopher Spencer developed this rifle in his spare time, and it was to become the world's first practical military repeater. Its tubular magazine, which held seven rounds, was located in the butt stock; a lever that formed the trigger guard opened the rolling breech and extracted the spent cartridge. Closing the breech pushed a fresh round into the chamber. The hammer was cocked by hand.

DATE	1863
ORIGIN	US
WEIGHT	10 LB (4.55 KG)
BARREL	28¼ IN (72 CM)
CALIBER	.52 IN

BEST OF BOTH WORLDS

The Non-Commissioned Officer (NCO) of the Union Army had one foot in the past and the other in the future. He carried a sword into battle, but also a carbine, the shortened form of the magazine repeater rifle Christopher Spencer patented in 1860.

THE BOER WAR
The technological advances of the early 20th century—smokeless gunpowder, automatic handguns, machine-fed rifles, and machine guns—had an impact on the conflict between the British and the two Boer republics (1899–1902). Earlier weaponry, such as the bayonet, was also still in use.

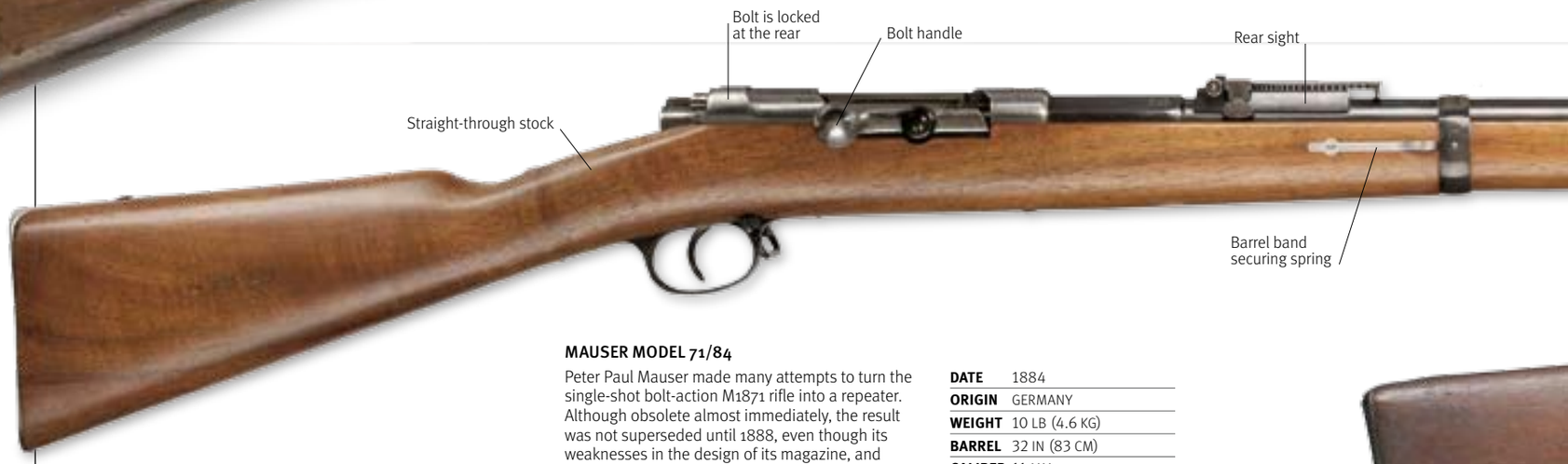
MANUALLY LOADED REPEATER RIFLES 1881–1891

THE FIRST GENERATION OF REPEATER rifles were mostly American underlever designs. Having been introduced to the bolt action by Von Dreyse and seduced into accepting it by Peter Paul Mauser and others in the single shot rifles of the 1870s, European users believed it to have clear advantages over the American rifles. Not only was the bolt action more secure—because it locked its action by means of lugs, which engaged with others in the receiver when the bolt was turned—but it was more practical when shooting from the prone position.

SCHMIDT-RUBIN M1889

In 1889 Colonel Rudolf Schmidt of the Swiss Army developed a straight-pull bolt-action rifle with a 12-round box magazine. It was accepted as the regulation rifle, and remained in service, only slightly modified, until 1931, when its bolt action was rejigged to operate in half the length. The modified version was only discarded in the late 1950s, and a sniper's version was in use until 1987.

DATE	1889
ORIGIN	SWITZERLAND
WEIGHT	9.8 LB (4.45 KG)
BARREL	30.75 IN (78 CM)
CALIBER	7.5 MM



MAUSER MODEL 71/84

Peter Paul Mauser made many attempts to turn the single-shot bolt-action M1871 rifle into a repeater. Although obsolete almost immediately, the result was not superseded until 1888, even though its weaknesses in the design of its magazine, and its tendency to pull to the right, were well known.

DATE	1884
ORIGIN	GERMANY
WEIGHT	10 LB (4.6 KG)
BARREL	32 IN (83 CM)
CALIBER	11 MM

INFANTERIEGEWEHR M1888

When it came to replacing the M71/84 the German Army set up a specification commission but the characteristics of new 7.92 mm ammunition had been misunderstood, leading to many burst barrels. In addition, the box magazine was a poor design; it was never rectified.

DATE	1888
ORIGIN	GERMANY
WEIGHT	8 LB (3.82 KG)
BARREL	29 IN (74 CM)
CALIBER	7.92 MM x 57 M88

KRAG-JØRGENSEN M1888

Many held that the M1888 was obsolete before it was adopted by the Danish Army, because its five-round magazine had to be hand-loaded, one round at a time, and its bolt's single locking-lug limited it to low-velocity ammunition. It came as a surprise, even to its inventors, that it was also adopted by both the US and Norwegian Armies.

DATE	1888
ORIGIN	NORWAY
WEIGHT	9 LB (4.05 KG)
BARREL	30 IN (76.2 CM)
CALIBER	6.5 MM x 55

FULL VIEW

LEE-METFORD

The British Army opened a competition to find a replacement for the single-shot Martini-Henry rifle in 1879; 11 years later, it adopted the .303 in rifle, Magazine, Mark I (the name was changed in 1891 to include those of its designers). It had an enclosed bolt action and a box magazine, the work of James Lee, and had anti-fouling rifling developed by William Metford.

DATE	1888
ORIGIN	UK
WEIGHT	9 LB (4.05 KG)
BARREL	30 IN (76.2 CM)
CALIBER	.303 IN

CAVALRY CARBINE MODELLO 1891 TS

Often known as the Mannlicher-Carcano, it used a modified version of the bolt-action Mauser developed for the M1889. It continued, in modified form, in Italian service until after World War II, and many were sold to dealers in the US; one found its way to Lee Harvey Oswald, who probably used it to kill President John F. Kennedy in 1963.

DATE	1891
ORIGIN	ITALY
WEIGHT	6 LB (3 KG)
BARREL	17 IN (45 CM)
CALIBER	6.5 MM x 52

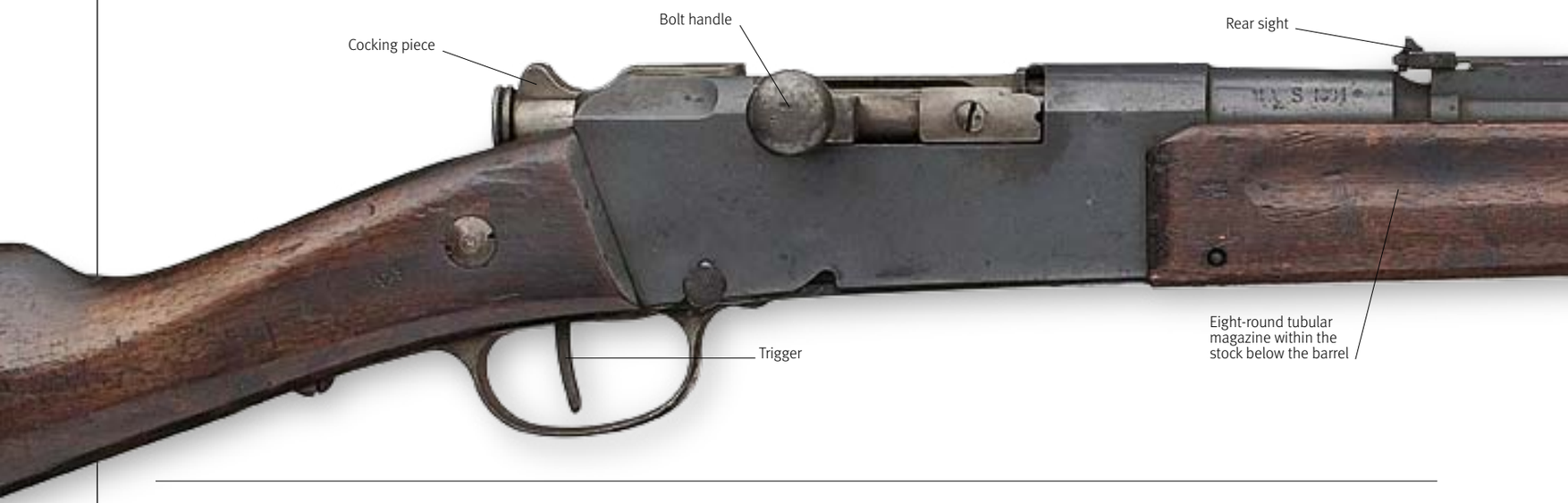
MANUALLY LOADED REPEATER RIFLES 1892–1898

BY THE START OF THE LAST DECADE of the 1800s—a century that had seen firearms technology revolutionized, the world's armies were finally accepting that repeater rifles were reliable enough to be safely adopted for general use. In fact, the genre had almost reached its final form by this time; once the box magazine had been taken up, remaining modifications were often little more than cosmetic, to reduce weight or to allow cheaper manufacturing methods to be used.

"3-LINE" RIFLE M1891

The M1891 is usually known as the Mosin-Nagant, after its designers. It was Imperial Russia's first repeater rifle, and its first in a "modern" caliber (a "line" was a measure approximating to one-tenth of an inch, and refers to its caliber). It was issued in a variety of forms, including a semi-carbine and a true carbine, and was still in service as a sniper rifle with the Red Army until the 1960s.

DATE	1891
ORIGIN	RUSSIA
WEIGHT	9¾ LB (4.43 KG)
BARREL	31½ IN (80.2 CM)
CALIBER	7.62 MM x 54R



MANNLICHER M1895

The straight-pull bolt-action M1895 was the work of Ferdinand von Mannlicher, and used a rotating locking lug turned in a camming (spiraled) groove. Ammunition was fed from a fixed box magazine that Mannlicher also designed. It was used widely throughout the Austro-Hungarian empire.

DATE	1895
ORIGIN	AUSTRIA
WEIGHT	8½ LB (3.78 KG)
BARREL	30 IN (76.5 CM)
CALIBER	8 MM x 50R

MAUSER M1896

Waffenfabrik Mauser began exporting rifles, to China, in 1875; then came the Mauser-Koka, for Serbia, the Belgian M1889, the Turkish M1890, the Argentine M1891, and the Spanish M1893. The world's armies seemed to be beating a path to Mauser's door, and in 1895 it was Sweden's turn. The design it adopted had a number of modifications, some of which found their way into later types.

DATE	1896
ORIGIN	GERMANY
WEIGHT	8¾ LB (3.97 KG)
BARREL	29 IN (74 CM)
CALIBER	6.5 MM x 55

ARISAKA MEIJI 30

At the conclusion of its war with China in 1895, the Japanese Army decided to adopt a modern weapon in a small caliber. This gun, designed by Arisaka, chambered for a 6.5 mm semi-rimmed round, with an enclosed five-round box magazine, was adopted. It used a turning bolt of the Mauser pattern with forward-locking lugs. It came into service in the 30th year of the Emperor Meiji.

DATE	1897
ORIGIN	JAPAN
WEIGHT	9½ LB (4.3 KG)
BARREL	31½ IN (80 CM)
CALIBER	6.5 MM x 50SR

FULL VIEW

LEBEL MLE 1886/93

In 1885 Boulanger was appointed to the Ministry of War in Paris. One of his first priorities was to introduce a modern rifle. The result was the first rifle firing a small-caliber, jacketed bullet propelled by smokeless powder (invented by Meille in 1884/5); despite being mechanically unsophisticated, it rendered every other rifle in the world obsolete. This modified version followed in 1893.

DATE	1893
ORIGIN	FRANCE
WEIGHT	9½ LB (4.3 KG)
BARREL	31½ IN (80 CM)
CALIBER	8 MM x 50R

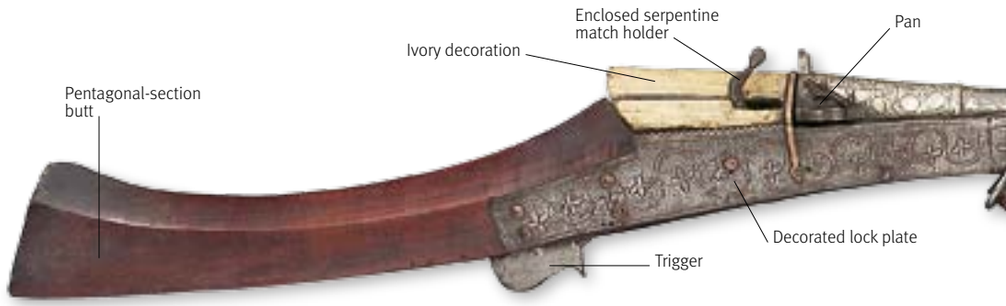
MAUSER INFANTERIEGEWEHR 98

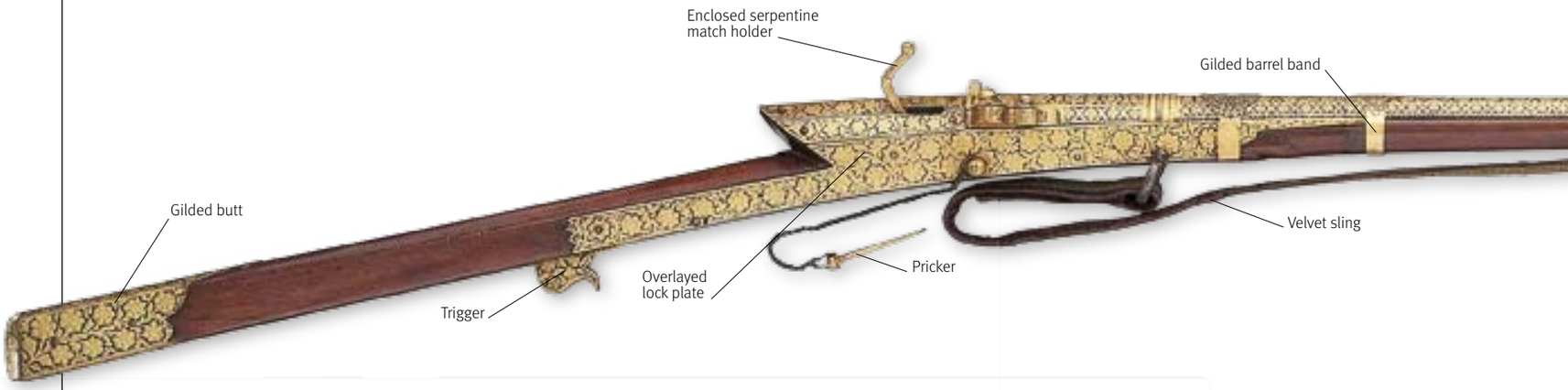
By the time of the Gew98, Mauser had solved virtually every problem known to beset the bolt-action magazine rifle. It added a third rear-locking lug to reinforce the two forward-mounted lugs, as well as improving gas sealing and refining the magazine. If the rifle had a fault, it lay in the design of its bolt handle.

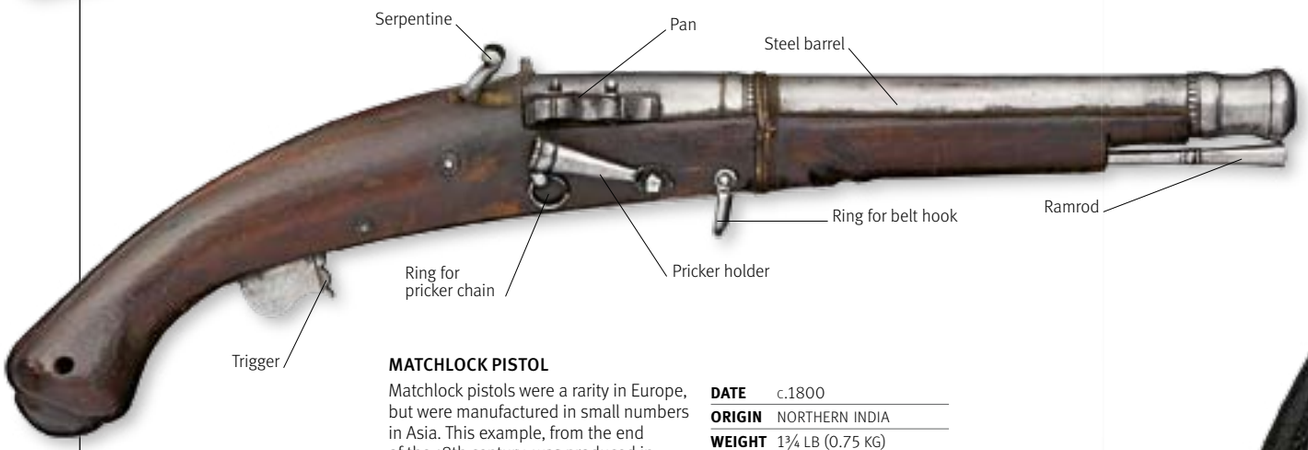
DATE	1898
ORIGIN	GERMANY
WEIGHT	9¼ LB (4.15 KG)
BARREL	29¼ IN (74 CM)
CALIBER	7.92 MM x 57

INDIAN FIREARMS

FIREARMS WERE INTRODUCED to India from central Asia and Europe at the end of the 15th century. Well into the 19th century, indigenous craftsmen were still making matchlocks, rather than the more complicated wheellocks and flintlocks, because they were easier and cheaper to produce. However, Indian gunmakers were no strangers to intricate decoration, and produced some very ornate pieces using ivory, bone, and precious metals as inlays.







MATCHLOCK PISTOL

Matchlock pistols were a rarity in Europe, but were manufactured in small numbers in Asia. This example, from the end of the 18th century, was produced in northern India. The items below the pan are a holder for the prickers and a ring to which its chain was attached.

DATE	c.1800
ORIGIN	NORTHERN INDIA
WEIGHT	1¾ LB (0.75 KG)
BARREL	9¾ IN (24.5 CM)
CALIBER	18-BORE

INDORE TORADOR

This simple matchlock shows some features commonly found on firearms of this period, notably the pentagonal cross-section of the butt stock and its pronounced recurve. The side plates at the lock are iron with crudely incised decoration that continues down the barrel; there are four leather thongs serving as barrel bands, but that closest to the breech is wire.

DATE	c.1800
ORIGIN	INDORE, INDIA
WEIGHT	7½ LB (3.4 KG)
BARREL	44 IN (112 CM)
CALIBER	.55 IN

MATCHLOCK REVOLVING MUSKET

Made near the start of the 19th century in the Indore region of northern India, this matchlock revolving musket is an ambitious attempt to marry the technologies of two periods using local materials and fabrication techniques. The cylinder is indexed manually; the vents in the barrel are there in case the charge in a chamber not aligned with the barrel is ignited by flash-over—a real possibility.

DATE	c.1800
ORIGIN	INDORE, INDIA
WEIGHT	13 LB (5.9 KG)
BARREL	24½ IN (62 CM)
CALIBER	.6 IN

BUNDUKH TORADOR

Probably made in Gwalior at the beginning of the 19th century, this extremely ornate matchlock was almost certainly a presentation piece. Like all matchlocks, it was supplied with a touch-hole pricker, though since this, too, is gilded, it can hardly be considered to be entirely functional. Guns of this type were normally held beneath the arm, not against the shoulder.

DATE	c.1800
ORIGIN	GWALIOR, INDIA
WEIGHT	6½ LB (3 KG)
BARREL	45¼ IN (115 CM)
CALIBER	.55 IN

PUNJABI FLINTLOCK PISTOL

This is one of a pair of superbly decorated pistols made in Lahore (now part of Pakistan) early in the 19th century. By this time, Sikh gunmakers were well able to fashion the components of a flintlock, though most of their energies were devoted to somewhat more workaday muskets known as *jazails*. This pistol has a "damascened" barrel, formed by coiling strips of steel around a mandrel and then heating and beating them to weld them together.

DATE	c.1800
ORIGIN	LAHORE, INDIA
WEIGHT	1.9 LB (0.86 KG)
BARREL	8.5 IN (21.5 CM)
CALIBER	28-BORE

ASIAN FIREARMS

PORTUGUESE TRADERS INTRODUCED firearms to Japan when they first arrived there in 1543 CE, and indigenous craftsmen soon began to copy the new weapons. Less than a century later, all foreigners were expelled and the country was cut off from Western influences by imperial decree. As a result, later types of firearm were largely unknown in Japan, and Japanese gunsmiths almost exclusively produced matchlocks until the mid-19th century, using methods that were unlike those seen elsewhere.

CHINESE MATCHLOCK WALL GUN

Wall guns were designed to be fired from a rest, and were far too long and unwieldy to be used in any other way. This example originated in China; it is extremely simple in both design and execution, with a forward-acting snap-matchlock that was sprung by a long bar trigger. It is entirely functional, and devoid of decoration.

DATE	c.1830
ORIGIN	CHINA
BARREL	63 IN (160 CM)

JAPANESE PILL-LOCK CARBINE

Though Japan's doors were closed to foreigners for more than 200 years, there were occasional illicit contacts, and it was probably through these that pill-lock technology, which had a brief currency in Europe around 1820, arrived in Japan. This carbine has a device that dispenses a fresh primer "pill" from a small magazine when the pan cover is lifted.

DATE	c.1850
ORIGIN	JAPAN
WEIGHT	8 LB (3.64 KG)
BARREL	26½ IN (67 CM)
CALIBER	12.5 MM

LARGE-BORE JAPANESE MATCHLOCK

This type of matchlock firearm was sometimes used to launch a primitive incendiary device, the fire arrow. It dates from toward the end of the Tokugawa shogunate, 1603–1867, as evinced by the *mon* that decorate the barrel. The lock and trigger are missing—the former has been replaced by a plain brass plate.

DATE	c.1850
ORIGIN	JAPAN
WEIGHT	9 LB (4.12 KG)
BARREL	27¼ IN (69.3 CM)
CALIBER	18.3 MM

FULL VIEW

JAPANESE TEPPO

Produced by Sakai's eminent Enamiya family, gunmakers since 1560, this *teppo* displays their trademark features: the brass shapes inlaid into the stock, and the characteristic muzzle shape. It is decorated with *kara kusa* (vine motifs) and *mon* (family badges); the lacquerwork is probably a later addition. Its furniture is of brass, and the upper three flats of the octagonal barrel are decorated in silver, brass, and copper.

DATE	c.1800
ORIGIN	JAPAN
WEIGHT	6 LB (2.77 KG)
BARREL	39¼ IN (100 CM)
CALIBER	1.142 IN

TIBETAN MEDA

While Tibet, like Japan, was largely isolated from the rest of the world until the mid-19th century, it was for geographic rather than political reasons. Trade did occur, however, with India and China, and this matchlock, or *meda*, shows considerable Chinese influence in both form and decoration. Attached to the fore stock is a rest, an unusual feature.

DATE	c.1780
ORIGIN	TIBET
WEIGHT	9¼ LB (4.15 KG)
BARREL	43.75 LB (111 CM)
CALIBER	17 MM

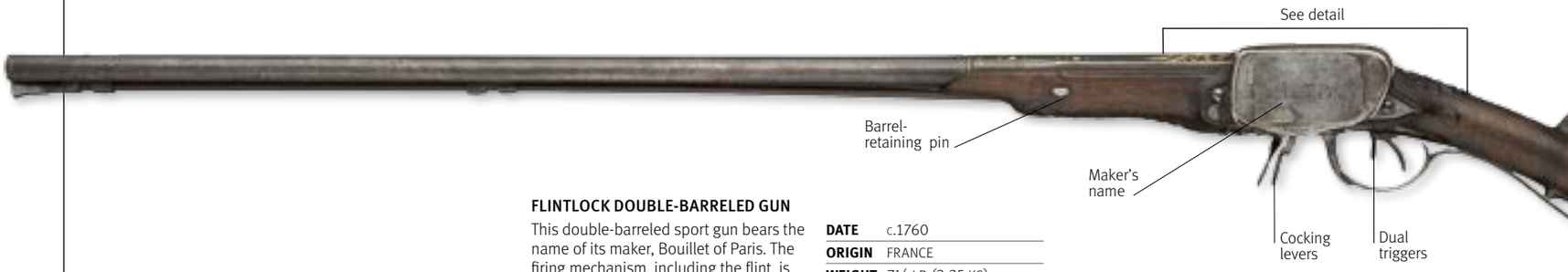
MULTI-SHOT FIREARMS

THE MAIN SHORTCOMING OF THE MUZZLE-LOADER was the time it took to reload. As a result, gunmakers the world over endeavored to produce weapons that could fire more than a single shot. The typical approach was to use multiple barrels, but guns with more than two barrels tended to be so heavy as to render them impractical. It was not until the 1830s that the young Samuel Colt developed his revolver—the first successful multi-shot, single-barreled firearm. Colt obtained a patent to protect his invention until 1857, but many sought ways to evade it. Most produced firearms that, at best, were only marginally effective.

FLINTLOCK REVOLVING RIFLE

French gunmakers produced some of the finest sport guns of the 17th century. This example has three revolving chambers, each fitted with its own striker and spring. This type of multi-shot weapon risked a dangerous chain reaction, in which firing one chamber set off all of the others.

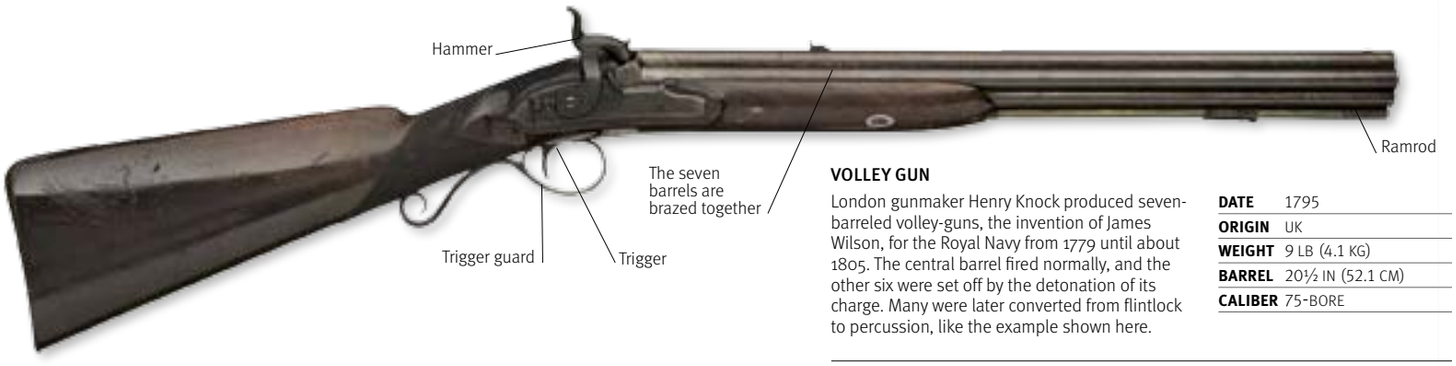
DATE	c.1670
ORIGIN	FRANCE
WEIGHT	7½ LB (3.37 KG)
BARREL	31¼ IN (79.5 CM)
CALIBER	22-BORE



FLINTLOCK DOUBLE-BARRELED GUN

This double-barreled sport gun bears the name of its maker, Bouillet of Paris. The firing mechanism, including the flint, is concealed in a box. The two levers in front of the trigger guard cocked the piece ready for discharging the barrels.

DATE	c.1760
ORIGIN	FRANCE
WEIGHT	7¼ LB (3.25 KG)
BARREL	32 IN (81.3 CM)
CALIBER	22-BORE



VOLLEY GUN

London gunmaker Henry Knock produced seven-barreled volley-guns, the invention of James Wilson, for the Royal Navy from 1779 until about 1805. The central barrel fired normally, and the other six were set off by the detonation of its charge. Many were later converted from flintlock to percussion, like the example shown here.

DATE	1795
ORIGIN	UK
WEIGHT	9 LB (4.1 KG)
BARREL	20½ IN (52.1 CM)
CALIBER	75-BORE

FULL VIEW

UNDER-HAMMER TURRET RIFLE

The so-called turret gun, an attempt to evade Colt's patent, appeared in the 1830s. Examples also exist in which the wheel of cylinders is set vertically. It soon became apparent that if flash-over from one cylinder to another occurred, the result would most likely be catastrophic to any bystanders, or even the shooter himself.

DATE	1839
ORIGIN	UK
WEIGHT	9 LB4.07 KG ()
BARREL	29 IN (73.7 CM)
CALIBER	14-BORE

MARTINI-HENRY CONVERSION

This is a single-shot, breech-loading Martini-Henry rifle converted into a repeater by the addition of a box magazine and a spring-loaded finger. The finger, operated by the breech lever, pushed a cartridge into the breech as it closed. The British Army never adopted this modification.

DATE	1888
ORIGIN	UK
WEIGHT	10½ LB (4.76 KG)
BARREL	33¼ IN (84.5 CM)
CALIBER	.45 IN

ENCLOSED LOCK DETAIL

The flintlock sport gun often misfired, either because the flint had broken or the primer had become damp. When it did fire successfully, the flash and smoke from the pan could obscure the target from view or frighten the game. Enclosing the firing mechanism in a box (seen here with the cover removed), solved two of these problems, keeping the powder dry and minimizing disruption from the flash and smoke.

AMMUNITION PRE-1900

A GUN IS nothing without a bullet. In early times, bullets were often made of iron, and could pierce armor, but later, lead was adopted because it was easier to mold. The bullet-shaped projectile was developed only in the 19th century, and so too was the cartridge.

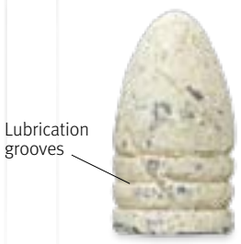
The powder-and-ball era

To achieve any sort of accuracy, the ball fired from a smooth-bore gun had to be spherical and of an exact size. Rifling improved matters, but made the weapon slow to load; the problem was solved by the expanding bullet.

MUSKET/RIFLE BALLS
The size of the ball was expressed in "bore," being the number of balls of a set size that could be cast from 0.45 kg (1 lb) of lead.

BELTED BALLS
To improve accuracy, barrels were "rifled" with pairs of grooves into which the belt on the ball fitted.

EXPANDING BULLETS
These bullets had a hollow base. The force of the powder detonating caused the bullets' skirts to expand and take the rifling.



LUBRICATION
The grooves around the bullet were greased to lubricate the barrel and make it easier to clean.

PERCUSSION CAPS
Fulminate, which explodes when struck, is sandwiched between two layers of thin copper foil, shaped to fit over a pierced nipple.

PAPER-WRAPPED CARTRIDGES
The first cartridges were nothing more than paper packages containing a measured charge of powder and a ball.

Transitional cartridges

Nineteenth-century gunmakers experimented with cartridges containing both propellant and projectile, which could be loaded whole. Wrapped in paper, skin, or fabric, they posed a problem for breech-loading guns, whose breeches had to be sealed. The solution was to switch to cartridge cases made of brass, into which the primer was integrated. This meant that the empty case had to be removed, but that was a small price to pay for perfect obturation (breech-sealing).

TEAT-FIRE CARTRIDGE
These were produced as a way around Smith & Wesson's monopoly of the bored-through cylinder. The bullet is entirely contained.

PIN-FIRE CARTRIDGE
The gun's hammer falls vertically on the pin, driving it into the primer that is contained in the base of the cartridge case.

SHARPS' CARTRIDGE
This case is made of linen. Its base was cut off by the edge of the breech-block when the action was closed.

BURNSIDE CARTRIDGE
Burnside's breech-loading carbine incorporated a drop-down breech, loaded from the front. It was chambered for this unique tapering cartridge.

WESTLEY RICHARDS "MONKEY TAIL" CARTRIDGE
This paper-wrapped carbine cartridge incorporated a greased felt wad at the rear, which remained in the breech until expelled ahead of the following round.

SNIDER-ENFIELD CARTRIDGE
The cartridge developed by Colonel Boxer for the Snider-Enfield rifle had a perforated iron base and walls built up from coiled brass strips.

Rifle cartridges

For a rifle to fire accurately, its ammunition must be properly formulated. Bullet weight and caliber must be matched accurately with the weight of the propellant charge.

.450 MARTINI-HENRY
The Martini-Henry rifle's cartridge was loaded with 85 grains (5.5 g) of black powder. The bullet weighed 480 grains (31 g).

.45-70 SPRINGFIELD
The cartridge devised for the Springfield rifle was loaded with 70 grains (4.53 g) of powder and a 405-grain (26.25 g) bullet.

.30-30 WINCHESTER
The .30-30 Winchester cartridge was the first "civilian" round to be charged with smokeless powder; it had 30 grains (1.94 g) of it.

.303 MK V
Until the 1890s, rifle bullets were blunt-nosed. The British Army's Lee-Metfords and Lee-Enfields were chambered for the one shown.

.56-50 SPENCER
This is the rimfire black-powder round for which the Civil War-era Spencer carbine, the first effective repeater rifle, was chambered.

11MM CHASSEPOT
After the Franco-Prussian War, the cartridge developed for the Mauser M/71 rifle was adapted for the Chassepot rifle, which was converted to take it.

5.2MM X 68 MONDRAGON
This early attempt at producing a high-velocity round in a miniature caliber was designed in Switzerland for the Mexican Mondragon rifle.

Pistol cartridges

In all cartridges, dimensional accuracy is essential. Cases that are even minutely undersize may split on firing, making them difficult to extract. This is easily rectified in a revolver, but less so with a self-loading pistol.

.44 HENRY
This rimfire round had primer arranged around the base of its case. It was soon superseded by the center-fire cartridge.

.44 ALLEN & WHEELOCK
Allen & Wheelock revolvers were chambered for "lip-fire" cartridges (similar to rimfire), chiefly in small calibers.

.45 COLT (BÉNÉT)
Colonel S.V. Bénét's 1865 version of the center-fire cartridge formed the basis for Berdan's later version.

.45 COLT (THUER)
Alexander Thuer developed a method of converting Colt "cap-and-ball" revolvers to fire this tapering brass cartridge.

.44 SMITH & WESSON AMERICAN
This first .44 in Smith & Wesson was unsatisfactory, as the projectile was "heel seated," rather than crimped in the case.

.44 SMITH & WESSON RUSSIAN
The revolvers Smith & Wesson supplied to the Russian Army were chambered for a cartridge of different dimensions.

.577 WEBLEY
Many small-caliber bullets lacked the power to stop a man. Webley addressed this with a .577 in caliber revolver.

.476 WEBLEY
The .577 in revolver was unwieldy and a replacement in .476 in caliber was adopted instead. It, too, was short-lived.

.455 WEBLEY
Webley's first smokeless powder cartridge was more powerful than earlier types, allowing a further reduction in bullet weight.

10.4 MM BODEO
The cartridge for the 10.4 mm Bodeo revolver, used by the Italian Army from 1891, gave a muzzle velocity of 837 ft (255 m) per second.

7.63 MM BERGMANN
The rimless, grooveless cartridge for which the Bergmann No 3 pistol was originally chambered was extracted by pressure alone.

Shotgun cartridges

Only the very largest shotgun cartridges were made entirely of brass. Others had cardboard bodies.

WILDFOWL CARTRIDGE
Large cartridges such as this were loaded with up to ¾ oz (20 g) of black powder and 3½ oz (100 g) of shot.

10-BORE PIN-FIRE
Pin-fire shotguns were still common long after other such guns had disappeared.

INDIAN ARMOR AND SHIELDS

SEVERAL INDIAN STATES put up serious resistance to the British forces that were extending their rule over the subcontinent during the 18th and 19th centuries. They included the kingdom of Mysore, which held out from 1766 to 1799, and the Sikhs in the Punjab, who lost two wars against the British (1846–47 and 1848-49) but each time imposed heavy casualties. Indian armies used European muskets and artillery alongside traditional edged weapons and armor. As the disciplined use of firepower grew increasingly dominant in warfare, armor and shields were gradually relegated to a purely decorative role on the battlefield.

HELMET DETAIL
The upper finial of the helmet's sliding nasal bar is decorated with an image of the elephant-headed Hindu god Ganesh.

PETI AND CAP
Indian warriors often wore a *peti*, a girdlelike cuirass made of padded leather or cloth. This example is from the arsenal of Tipu Sultan in Mysore. Like the low-skulled cap, it would have offered only limited protection in battle.

DATE	LATE 18TH CENTURY
ORIGIN	MYSORE, INDIA
WEIGHT	PETI 3 LB (1.4 KG)
LENGTH	PETI 8¾IN (22CM)

TOP
This helmet, or *top*, is of a type worn by warriors across much of Asia from late medieval times onward. Characteristic features are the mail aventail and the spike and plume holders. The decoration includes a skull-and crossed-bones motif, possibly a sign of European influence.

DATE	LATE 18TH CENTURY
ORIGIN	GWALIOR, INDIA
WEIGHT	2¾ LB (1.3 KG)
HEIGHT	35½ IN (90 CM)

SIKH ARMOR
A Sikh warrior would have looked impressive in this mail shirt, plate cuirass, and plumed *top* (helmet). However, the iron-and-brass mail is "butted"—meaning that the rings are pressed against one another, rather than riveted or welded—so it could have been pierced by stabbing weapons and arrows.

DATE	18TH CENTURY
ORIGIN	INDIA

FULL VIEW

SIKH DHAL

This round shield, or *dhal*, dates from the wars between the Sikhs and the British East India Company. The intricate decoration in gold damascene includes Persian inscriptions, so perhaps the shield was not the work of an Indian craftsman.

DATE	1847
ORIGIN	INDIA
WEIGHT	8½ LB (3.8 KG)
WIDTH	22¼ IN (59 CM)

Persian inscriptions

Conical cane cap wrapped in silk pagri

SIKH QUOIT TURBAN

The sharp-edged quoit, or *chakram*, is a weapon particularly associated with the Sikhs. This tall turban carries six quoits of different sizes, ready to be lifted off and thrown at enemies. There are also three small knives in the turban armory.

DATE	18TH CENTURY
ORIGIN	INDIA
WEIGHT	2½ LB (1.2 KG)
HEIGHT	18½ IN (47 CM)

HOLY WARRIORS

The Sikh Akali sect combined religious asceticism with fearless fighting spirit. The *chakram* was the Akalis' favored weapon, launched either by whirling around the forefinger or held between thumb and forefinger and thrown underarm. The position of the quoits on an Akali's turban showed his spiritual status in the sect.

Shield of black lacquered hide

Pistol hidden in boss

Steel quoit

PISTOL SHIELD

This shield has a hidden offensive capacity. Each of the four golden bosses has a hinged flap that opens to reveal the short barrel of a small percussion pistol. The pistols, firing mechanisms, and hinged bosses have been fitted to a pre-existing conventional lacquered shield.

DATE	MID-19TH CENTURY
ORIGIN	RAJASTHAN, INDIA
WEIGHT	7½ LB (3.4 KG)
WIDTH	21¾ IN (55.5 CM)

GUN MECHANISM DETAIL

On the back of the pistol shield, there is a single central grip, which is attached to the mechanisms of the four pistols. Each pistol can be cocked individually, but they are all fired by a single trigger, operated by the fingers of the hand holding the shield grip.

AFRICAN SHIELDS

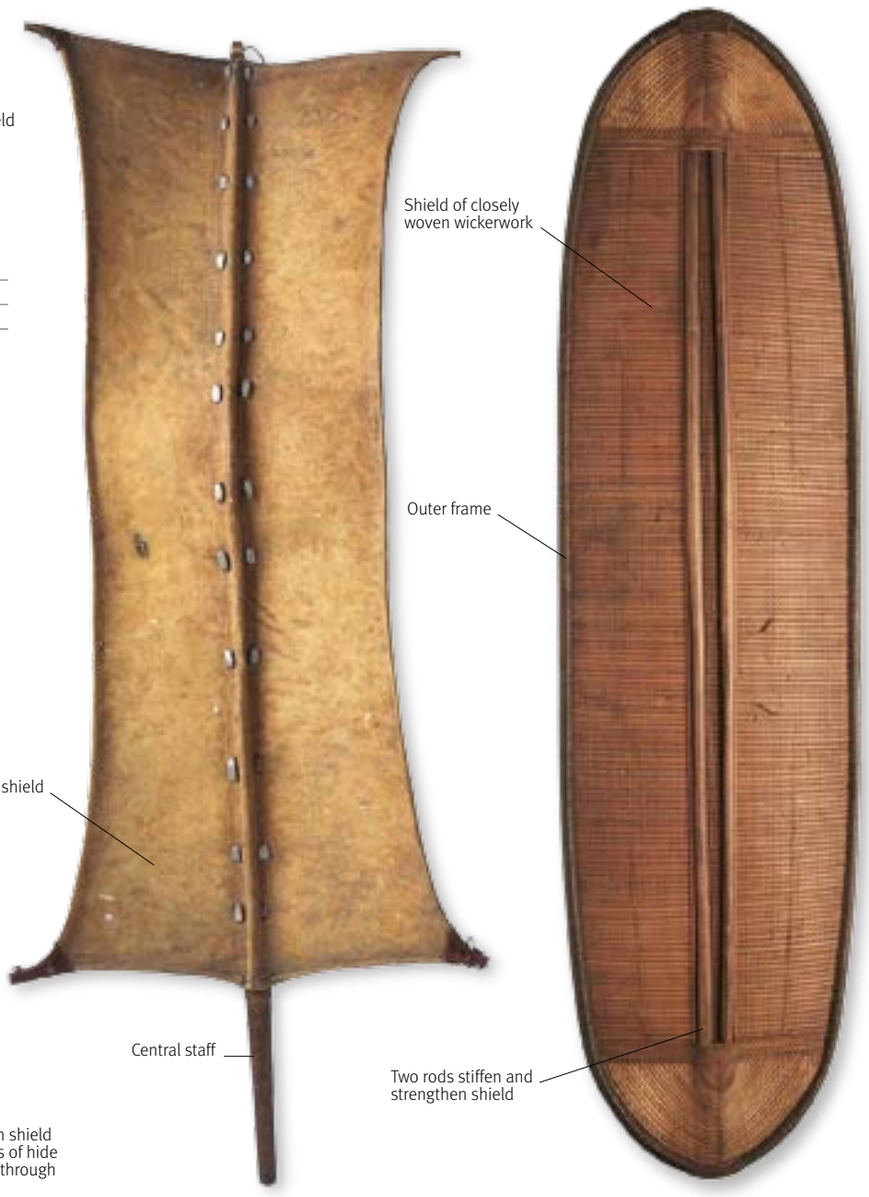
IN TRADITIONAL AFRICAN SOCIETIES, where body armor was not used, shields were the sole protection in warfare, aside from charms and amulets. Shields also played a prominent part in ceremonies and were decorated to show status or allegiance. Wood, animal hide, woven wicker, or cane made suitable materials for a shield to ward off arrows or blows from throwing knives, clubs, or spears. Shields could also be used offensively; for example, the sharpened lower tip of a Zulu shield stick might stab an opponent's foot or ankle.

ZULU WAR SHIELD

The Zulu warrior's oval shield was made of cowhide that had been prepared by scraping, cleaning, and several days' burial in soil or manure. The shield face was bound to the shield stick by two rows of hide strips that ran vertically from top to bottom of the shield. When advancing to attack, warriors would sometimes beat their shields with the butts of their spears.

DATE	19TH CENTURY
ORIGIN	SOUTH AFRICA
LENGTH	48 IN (122 CM)

FULL VIEW



RECTANGULAR SUDANESE SHIELD

Peoples of southern Sudan and northern Kenya—such as the Turkana, Larim, and Pokot—traditionally made symmetrical rectangular shields from animal hides, including buffalo, giraffe, rhinoceros, and hippopotamus. The central wooden shaft doubles as a grip.

DATE	LATE 19TH/EARLY 20TH CENTURY
ORIGIN	SUDAN
LENGTH	32½ IN (82.5 CM)

WICKERWORK SHIELD

Craftsmen of the Zande people of north central Africa made lightweight wickerwork shields into the early 20th century. A Zande warrior carried the shield in his left hand, along with any spare weapons, while holding his spear or throwing knife in his right hand.

DATE	c.1900
ORIGIN	DEM. REP. OF CONGO
LENGTH	51 IN (130 CM)

KIKUYU CEREMONIAL SHIELD

This wooden dance shield, or *ndome*, is of a type made by the Kikuyu people of Kenya. It was worn on the upper left arm by young warriors during elaborate Kikuyu initiation rights. The serrated design on the inside of the shield was always the same, but the outer design varied to indicate the age group and local origin of the warrior.

DATE	19TH CENTURY
ORIGIN	KENYA
LENGTH	23½ IN (60 CM)

ORNATE ETHIOPIAN SHIELD

Shields were still in military use in the kingdom of Ethiopia in the early 20th century. They were typically round, made of animal hide, and mounted in silver clasps. As well as serving him in combat, an Ethiopian warrior's shield announced his status. Shields were often decorated with the mane, tail, or paw of a lion, all symbols of Ethiopian royalty.

DATE	19TH CENTURY
ORIGIN	ETHIOPIA
WIDTH	19¾ IN (50 CM)

FULL VIEW

ROUND SUDANESE SHIELD

This round shield from Sudan is constructed of concentric cane hoops covered in colored cotton, with an iron outer frame, boss, and reinforcing bars. On the other side of the shield, there are hand grips of braided leather.

DATE	19TH CENTURY
ORIGIN	SUDAN
WIDTH	36.9CM (14½IN)

OCEANIAN SHIELDS

WARFARE WAS COMMON among the peoples of New Guinea and Melanesia, until largely stopped by colonial authorities during the 20th century. Wooden or wicker shields provided defense against weapons such as bone- or bamboo-tipped arrows, wooden spears, stone axes, and bone knives. The shields varied in size from large planks that could shelter the warrior's whole body to smaller parrying shields and breastplates. Many of the shields shown here date from the 20th century, but are identical to those in use before.

ASMAT WAR SHIELD

Warfare was central to the lives of the Asmat people, living on the south coast of the island of New Guinea. Their shields were not only a means of defense, but also psychological weapons, their decorative designs calculated to inspire terror. The flying fox fruit bat, represented on this shield, was symbolically associated with headhunting, since it took fruit from trees as a headhunter took a head from a body.

DATE	POST-1950
ORIGIN	IRIAN JAYA
LENGTH	51 IN (129 CM)

FULL VIEW

BASKET-WEAVE WAR SHIELD

This elegant elliptical shield is typical of those used on headhunting raids in the Solomon Islands until the late 19th century. Its closely woven coiled-cane wicker was an effective block, even against spears. Too small for passive defensive tactics, it was manipulated actively to parry blows and missiles.

DATE	19TH CENTURY
ORIGIN	NEW GEORGIA
LENGTH	32½ IN (83 CM)

MELPA CHEST-PLATE

This chest-plate shield, or *moka kina*, was made by the Melpa people of the Upper Sepik region of Papua New Guinea. Worn as body armor, it has shell and bamboo decoration.

DATE	c.1950
ORIGIN	PAPUA NEW GUINEA
LENGTH	15 IN (38 CM)

ASMAT WAR SHIELD

Each Asmat shield was named after an ancestor and this, along with the design motif, gave the warrior spiritual power and protection. Shields were made of wood and carved with stone, bone, or shell tools. The colors used in the decoration had symbolic significance, red representing power and beauty.

DATE	19TH CENTURY
ORIGIN	IRIAN JAYA
LENGTH	78¼ IN (199 CM)

MENDI WAR SHIELD

This Mendi shield is made of hardwood and decorated with a bold geometric pattern of opposing triangles known as a "butterfly wing" design. Unusually, highland shields were not used in ceremonies, but were purely for warfare. In combat, the shield was supported on a rope shoulder sling.

DATE	POST-1950
ORIGIN	PAPUA NEW GUINEA
LENGTH	48 IN (122 CM)

ARAWE WAR SHIELD

This shield, from the Kandrian area of New Britain, is typical of those produced by the Arawe people. Made of three oval-section, vertical planks of wood joined with split cane strips, it is incised with distinctive zigzag and coiled motifs. Natural black, white, and red ochers are the only colors used.

DATE	POST-1950
ORIGIN	PAPUA NEW GUINEA
LENGTH	49¼ IN (125 CM)

BIWAT WAR SHIELD

This shield is from Biwat village on the Yuat River in Papua New Guinea. Although narrow, it is a tall shield that would have offered full body protection. It is boldly decorated with a central panel and geometric shapes around the edge.

DATE	POST-1950
ORIGIN	PAPUA NEW GUINEA
LENGTH	67¼ IN (171 CM)

THE MODERN WORLD

The 20th century saw the outbreak of warfare on a truly global scale. Two world wars caused mass casualties and economic dislocation, as armies bigger than ever before fought continent-wide campaigns. New weapons systems ushered in an age of mechanized warfare, with tanks, aircrafts, and missiles replacing infantry as the arbiters of victory. The invention of nuclear weapons, moreover, complicated strategists' calculations with a destructive power that, for the superpowers, made their possession essential, and their use unimaginable.

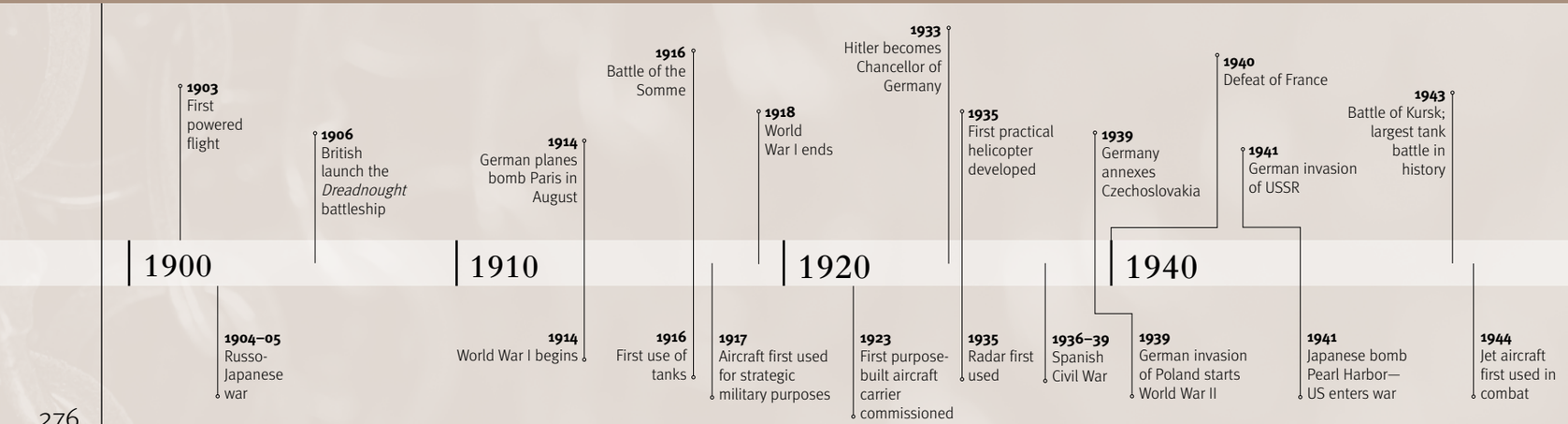
RUSSO-JAPANESE WAR
In February 1904, Japanese torpedo boats attacked the Russian fleet at anchor in Port Arthur. Outside observers drew the lessons that firepower would dominate any future conflict in Europe, and that the strategic imperative should be to strike fast, and hard.

AT THE START OF THE 20TH CENTURY, Europe lay in a state of uneasy calm, as countries shifted alliances in an attempt to gain advantage in the coming war, a conflict made ever more likely by their maneuvers. All had learned the lessons of Prussia's victories in the 1860s and 1870s, and by 1914, Europe's leaders had their fingers on a hair-trigger, believing that slowness to mobilize would lead to disaster. In the event, it was the very speed of their reaction to the assassination of Archduke Franz Ferdinand by Serbian nationalists in June 1914 that precipitated catastrophe.

Once Russia, fearful of Austrian plans, mobilized, the Austrians did so too, followed within a week by the Germans and French. Germany, desperate to knock France out of the war quickly, embarked on the Schlieffen Plan, which envisaged hooking its army around through Belgium and enveloping Paris from the north. The German General Staff, which throughout the war displayed great tactical ability, but strategic myopia, failed to realize the infringement of Belgian neutrality would bring Britain into the war. Even so, the German knock-out blow almost worked, as the French barely succeeded in halting the invaders in August at the Battle of the Marne.

The war stabilized into a confrontation along a 500-mile (800-km) front stretching from Switzerland to the Channel ports, a line from which it was barely to shift in four years of bitter and bloody fighting. Dug into trenchlines, each side's infantry forces proved almost impossible to dislodge, as machine guns, such as the air-cooled Hotchkiss, which fired 400–600 rounds per minute, made any attempt at assault a form of mass suicide.

ARTILLERY BOMBARDMENTS
Both sides struggled to find a means to break the deadlock. At Verdun in 1916, the Germans sought to bleed the French army dry by sucking it into holding a position where their artillery would inflict heavy casualties. The French defended Verdun tenaciously and did,



indeed, lose 120,000 men, but the German effort cost an equally damaging 100,000 dead. The use of artillery bombardments to precede assaults often turned the terrain into a morass —notably at Passchendaele in 1917—where forward progress was next to impossible and the floundering infantry made enticing targets for machine gun nests.

GAS AND TANKS

New weaponry was adopted to try to end the stalemate. Poison gas was first used on a large scale at Ypres in April 1915, and although the Germans then punched a 4-mile (6-km) hole in the French line, their advance was as much hindered as assisted by their fear of the chlorine gas's effect. Similarly, tanks first appeared at the Somme in September 1916, but did not really play a major operational role until Cambrai a few months later. Planes were at first used for reconnaissance, and from 1915, Zeppelin airships and then Gotha bombers made raids on British cities, but to little real strategic effect. At sea, the German U-boat submarine fleet threatened for a while to throttle British trade, but the introduction of the convoy system in 1917 stifled the losses.

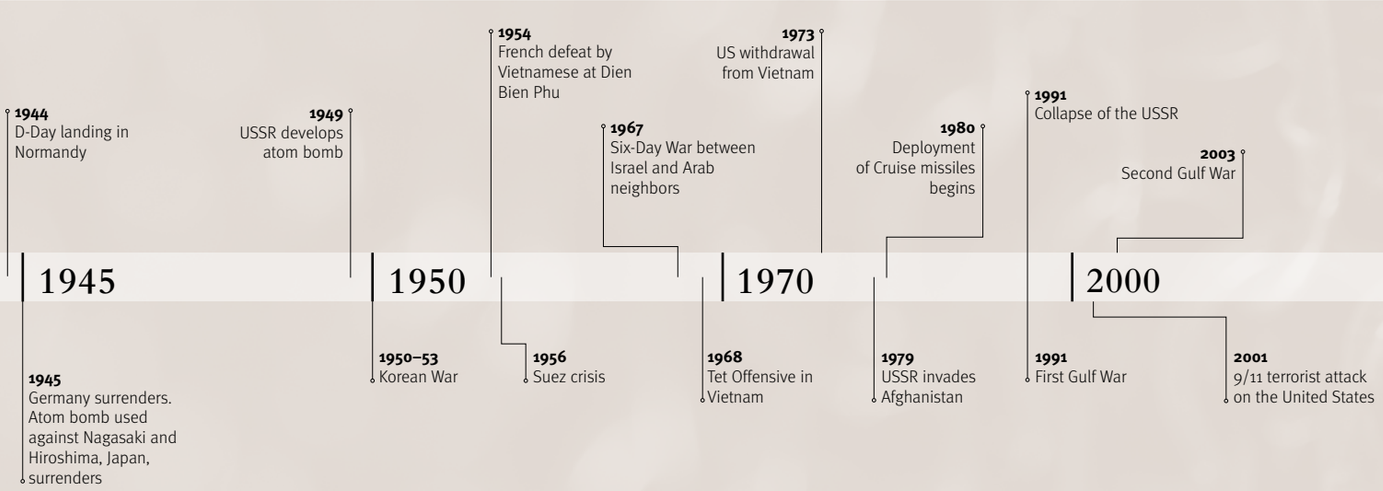
Despite a temporary German breakthrough in spring 1918, their resources were overstretched, their manpower dwindling, and industry struggling to keep up with the army's demands. When the Allies pushed back, it was against an open door, and, on the point of military, economic, and social collapse, Germany accepted an armistice in November.

German nationalist leaders felt betrayed by the armistice, which they portrayed as a political rather than a military capitulation. The economic crisis of the Great Depression, and helped boosted the rise of Fascism in Italy and Germany and cemented the rule of Communism in the new Soviet Union. Throughout the late 1930s, Hitler rearmed Germany, intimidated or annexed his weaker neighbors, and cowed France and Britain into acceptance. Hitler's failure to perceive that Britain was not fully acquiescent led to a strategic blunder—the invasion of Poland in 1939—which precipitated World War II. During 1940, German armies smashed through the Low Countries, Scandinavia, and France in a form of combat dubbed "Blitzkrieg." Armored formations moved far ahead of the infantry in France, wrong-footing the French high command who had expected the Germans to revisit the Schlieffen Plan from the previous war.

MACHINE GUN NEST
The widespread deployment of machine guns in World War I helped change the balance of advantage from attackers to defenders. The unit depicted here fought in the Battle of the Somme in July 1916, during which 20,000 British soldiers died in the first day of the attack alone, many of them falling victim to machine gun fire.

AERIAL BATTLE

Hitler's army, having outstripped their supplies, allowed the bulk of British forces to escape from Dunkirk. Hitler thus committed himself to the world's first purely aerial campaign, the Battle of Britain, in the summer of 1940, attempting to defeat the Royal Air Force and so clear the way for the invasion of the British Isles. The British had, however, developed radar to detect attacking aircraft, and the German Luftwaffe, already depleted in the campaign for France, suffered irreplaceable losses to a new generation of British fighter aircraft such as the Spitfire. Stretched to the limit, the Germans switched to night-bombing of cities from



FACTORY FIGHT
Russian soldiers advance during the 1942 Battle for Stalingrad. The Red Army's tenacious resistance in the city made the Germans fight – and take casualties – for every city block and building. Total German losses were over 500,000.

September and the invasion was indefinitely postponed. Strategic bombing was later employed by the British against Germany on a massive scale in an effort to destroy strategic industries, and—controversially—to undermine the enemy's morale. Dresden was virtually destroyed in February 1945 in a firestorm that engulfed it after an Allied bombing attack.

German troops were well-equipped, mostly with versions of the Mauser Gewehr 98 bolt-action rifle, and ably led by Europe's most professional officer corps. But at a higher level, strategic greed and overstretch bedevilled Germany's war. The invasion of the Soviet Union in June 1941 showed Hitler had not learned the lessons of Napoleon's 1812 campaign—Russia's vast size meant it could absorb huge losses of territory and manpower. Although the Germans reached the outskirts of Moscow in December 1941, their tanks could not operate in the cold, their infantry was not equipped for the freezing conditions, and they had no manpower in reserve, while the Russians had fresh divisions from the Siberian hinterland.

Germany was short of oil, too, which played a part in Hitler's decision to push southward to the oil fields of the Caucasus. At Stalingrad in 1942, the Germans were sucked into a bitter house-by-house struggle, the first real example of modern urban warfare. The Soviet counter-stroke that November trapped more than 200,000 troops in the city, a loss from which the German army never really recovered.

In the West, Allied armies made the largest amphibious landing in history in Normandy in 1944 and then thrust toward the German border. Germany developed a series of innovative weapons in a bid to turn the tide, including jet fighters (the V-2 rockets) and long-range missile systems, but could not prevent the fall of Berlin in May 1945.

NAVAL CAMPAIGN IN JAPAN

In the Pacific, the United States and its allies fought a parallel war against Japan from 1941. Precipitated by the unprovoked attack on Pearl Harbor in 1941, the war saw Japanese forces sweep through the Malay Peninsula, the Philippines, and a string of Pacific islands. The United States fought a naval-based campaign that left Japan's acquisitions isolated. At Midway in June 1942, the Japanese lost four aircraft carriers—a blow from which they never really recovered. Although Japanese resistance was tenacious, and the conquest of Okinawa alone in 1945 cost 65,000 American lives, the question became whether the United States had the stomach to invade Japan itself. America's response came with the first use of nuclear weapons on Hiroshima and Nagasaki in August 1945, which forced Japan's surrender and transformed the calculations of military strategists. For the next 45 years, the world experienced a "Cold War" where a balance of terror kept the peace. The United States established the NATO alliance in 1949 to confront the Soviet Union in Europe, and the Soviets responded with the formation of the Warsaw Pact in 1955. NATO never had sufficient ground forces in western Europe to hold back a serious Soviet land offensive. Paradoxically, this weakness helped keep the peace, as any such attack would have unleashed a nuclear strike against the Soviet Union.

CONFLICT IN KOREA AND VIETNAM

Potentially dangerous confrontations between the superpowers did emerge, most especially in Asia. In Korea from 1950–53, the United States fought a war to prevent the peninsula falling into communist hands, part of a strategy of containment that also led it into a fatal entanglement in Vietnam in the 1960s. Fearful of communist movement into South Vietnam, the United States was sucked into the provision, first of military aid and advisers, and then hundreds of thousands of ground troops. The war saw the first large-scale use of helicopters in a military role, and strategic bombing on a massive scale, but the United States was consistently wrong-footed in what was essentially a guerrilla war. With the pull-out of American combat forces in 1973, the South Vietnamese army were soon defeated.

MODERN WARFARE

The Middle East was historically an area of chronic tension, with a series of wars between Israel and its Arab neighbors (in 1948, 1967, and 1973). The superpowers did not become directly involved in conflicts in the region, except for funding proxies or diplomatic

AK47
The Kalashnikov assault rifle (or AK47) was first developed by the Soviet Union in 1947. Simple and inexpensive to manufacture, yet durable, it became a mainstay of guerrilla and liberation movements worldwide. This version, from around 1980, is of Chinese manufacture.

saber-rattling, until the 1990s. It was the oppressive Iraqi regime of Saddam Hussein, with ambitions for regional dominance and —it was claimed—to develop nuclear weapons —that precipated two American-led campaigns in 1991 and 2003. The first war saw the first combat use of cruise missiles and "smart" bombs, which, with laser-guidance, were less likely to fall off-target.

The 2003 Iraq campaign, which caused the fall of Saddam Hussein, featured a similar array of advanced weaponry. Yet American ground forces still had to fight their way to Baghdad, a task that proved that for all the advances in aircraft, missile, and communications technology, it still took troops on the ground to command a battlefield. Similarly, the United States' failure to deal with a growing insurgency movement in Iraq showed that the possession of nearly unlimited logistical support, battlefield weaponry of a power almost unimaginable a century earlier, and an arsenal of nuclear missiles, meant little where this power could not be brought to bear. Terrorism, religious fanaticism, failed states, and genocidal civil wars were the new challenges, with death as often dealt by the machete as the M16. As throughout history, the possession of the most advanced weapons was never enough by itself to shape the political landscape.

GUERRILLA WARFARE

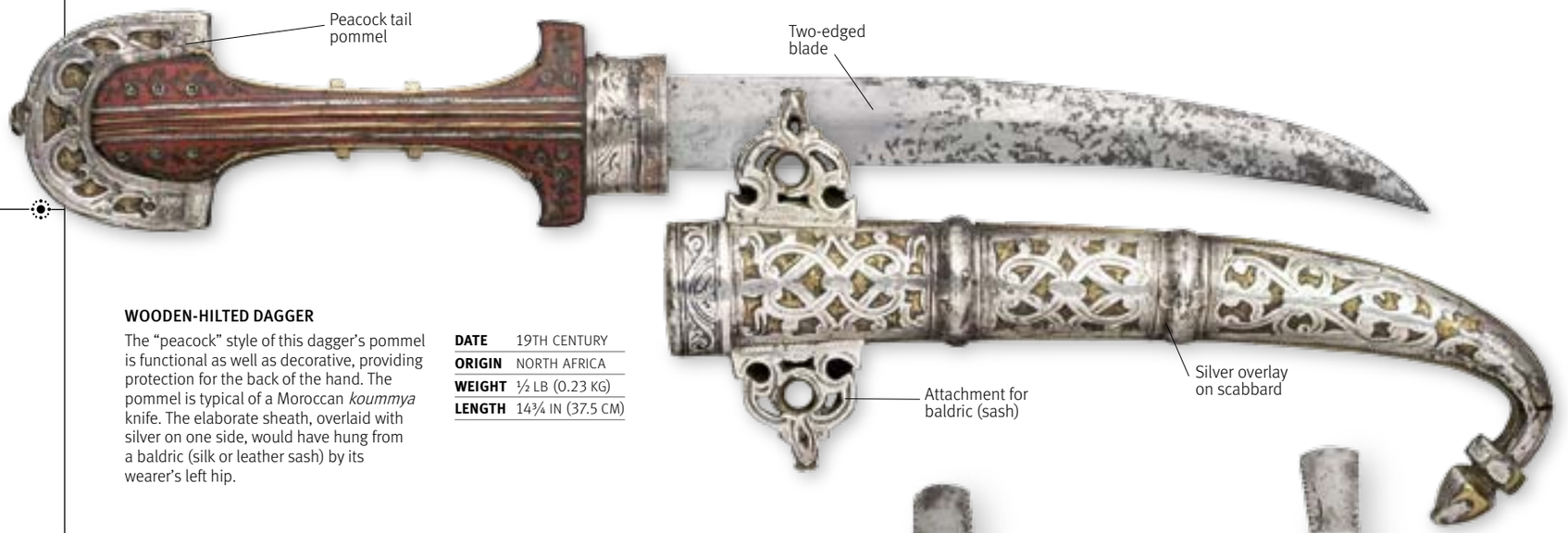
Although guerrilla tactics are almost as old as warfare itself—the Bar Kochba revolt of the Jews against Rome (132–35 CE) is but one example—in the 20th century, they have become identified with national liberation and revolutionary movements. When the Soviet Union invaded Afghanistan in 1979, it rapidly overran the cities, but found itself facing a disparate coalition of Afghan mujahidin guerrillas who dominated most of the countryside and received military aid, including Stinger anti-aircraft missiles, from the West. Eventually, the Soviets moved away from conventional armored tactics and mounted combined helicopter-infantry sweeps of the mujahidin's mountain strongholds. But, as with many guerrilla wars, they found it difficult to differentiate civilians from combatants and could not prevent the guerrillas from reinfilitrating areas they had just been driven from. Guerrilla warfare's aim is to undermine the political will of an occupier to remain by inflicting unacceptable losses. Finding itself at the wrong side of this equation, the USSR withdrew its forces from Afghanistan in 1989.

AFGHAN GUERRILLA FIGHTERS

GULF WARRIORS
An American Apache attack helicopter flies over a US tank formation in the Kuwaiti desert shortly before the assault on Iraq in 2003. Close air support of land formations played a key role in the American victory.

AFRICAN EDGED WEAPONS

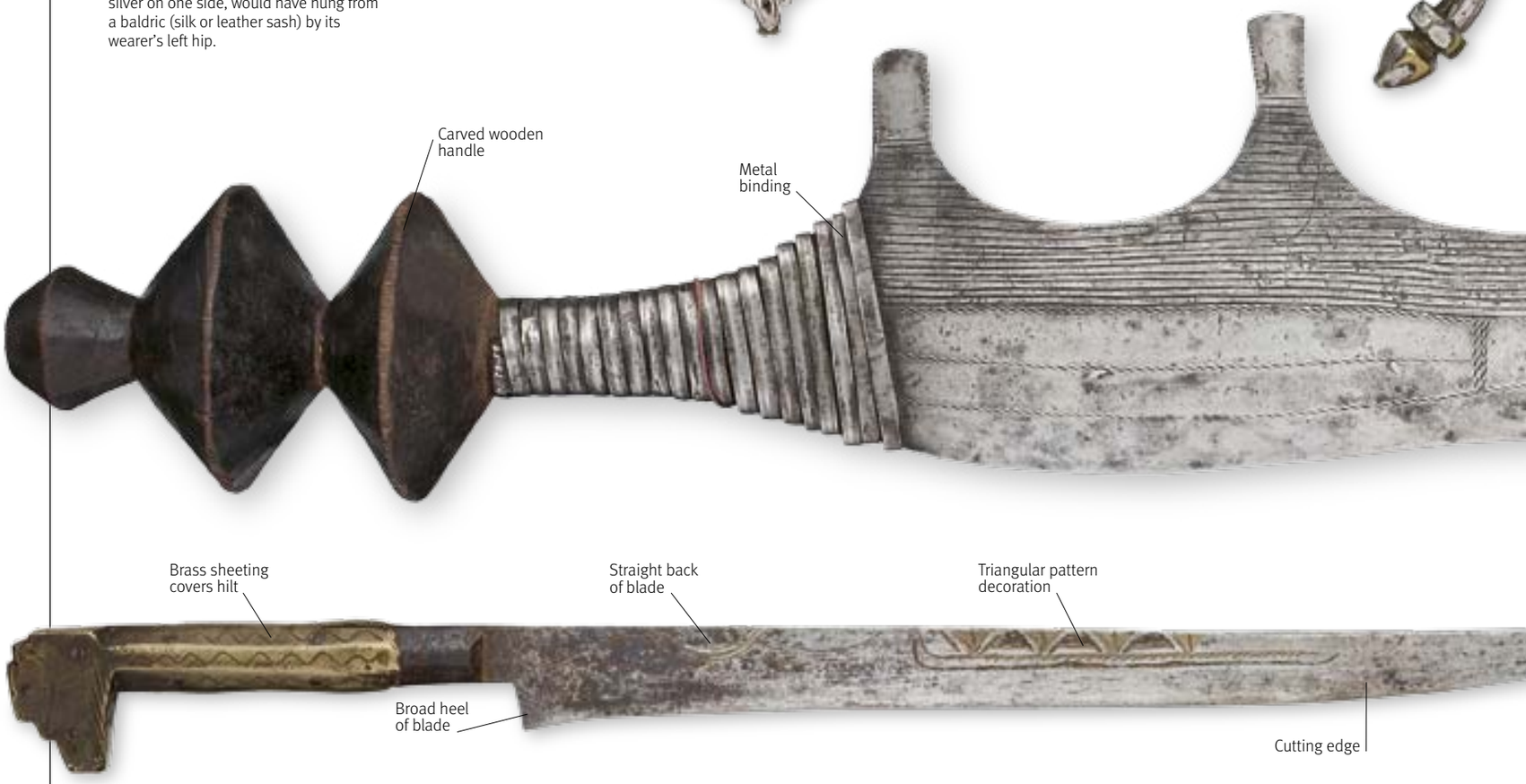
THE TRADITIONAL WEAPONRY found in Africa reflects the continent's ethnic and cultural diversity. North of the Sahara and along the East African coast, under Arab and Ottoman Turkish influence, weapons broadly resembled those found across the Islamic world. South of the Sahara the prevailing traditions produced edged weapons such as throwing knives, fighting bracelets, and "execution" knives that were often highly original in design. Many of these were in use long after the European colonial powers took over parts of Africa.



WOODEN-HILTED DAGGER

The "peacock" style of this dagger's pommel is functional as well as decorative, providing protection for the back of the hand. The pommel is typical of a Moroccan *koummya* knife. The elaborate sheath, overlaid with silver on one side, would have hung from a baldric (silk or leather sash) by its wearer's left hip.

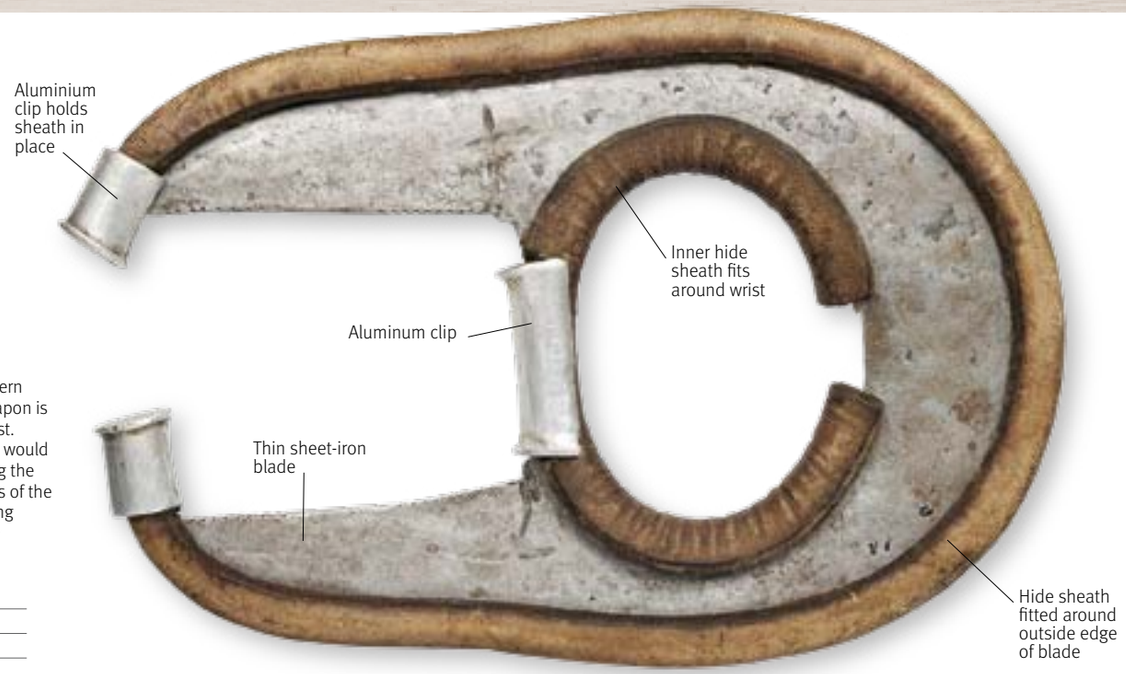
DATE	19TH CENTURY
ORIGIN	NORTH AFRICA
WEIGHT	½ LB (0.23 KG)
LENGTH	14¾ IN (37.5 CM)



FLYSSA

Although the origin of this knife is uncertain, in shape and decoration it resembles the *flyssa* saber used by the Kabyle Berbers of northeastern Algeria. The octagonal grip is covered in decoratively incised brass sheeting, which suggests this is a cut-down *flyssa*.

DATE	19TH/20TH CENTURY
ORIGIN	NORTH AFRICA
WEIGHT	¼ LB (0.16 KG)
LENGTH	14½ IN (37 CM)



LARIM FIGHTING BRACELET

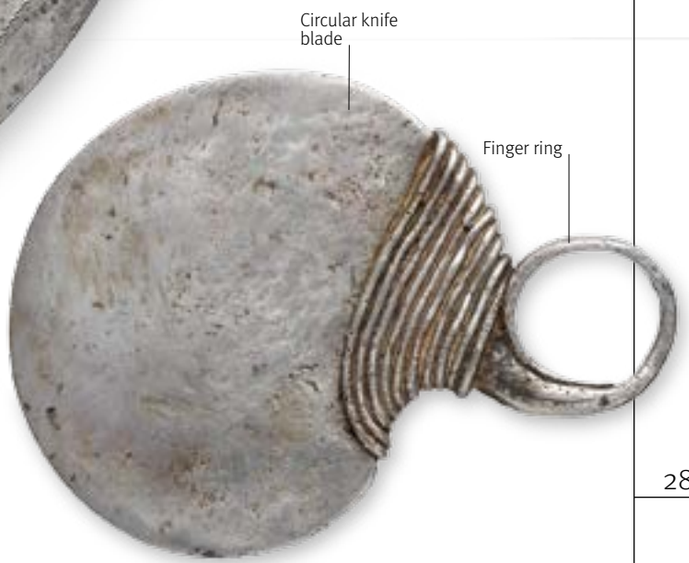
Known to the Larim people of southern Sudan as a *nyepel*, this unusual weapon is a two-pointed knife worn on the wrist. Before entering a fight, a Larim man would remove the outer sheath, uncovering the sharp edge and slightly rounded tips of the hammered iron blade. Similar fighting bracelets and sheaths were used by other Sudanese peoples.

DATE	20TH CENTURY
ORIGIN	SUDAN
WEIGHT	2½ OZ (70 G)
LENGTH	5½ IN (14 CM)

CEREMONIAL KNIFE

This elaborately shaped implement, from what is now the Democratic Republic of the Congo in central Africa, is of a kind historically known as an "execution" knife. Such knives were, however, also used for broader ceremonial purposes in cults and rituals. They were highly valued trade items and functioned on occasions as money—iron was a common form of currency in Africa.

DATE	c.1900
ORIGIN	DEM. REP. OF CONGO
WEIGHT	1¼ LB (0.61 KG)
LENGTH	24¾ IN (63 CM)



FINGER KNIFE

This small, broad-bladed knife probably comes from the Labwor people of northeastern Uganda. Made of iron, it was worn on a finger, and could be used for everyday purposes such as cutting meat, as well as for fighting. Its advantage as a weapon was that, because of its diminutive size, it could be concealed in the hand.

DATE	c.1890–1950
ORIGIN	UGANDA
WEIGHT	1¾ OZ (50 G)
LENGTH	3¾ IN (9.5 CM)

AFRICAN EDGED WEAPONS

CURVED SUDANESE KNIFE

Made by the Zande of southern Sudan, this "sickle knife"—so-called because of its curved blade—may have been used in war as a throwing knife, but could equally have served as a tool, or been carried as an emblem of power.

DATE	EARLY 20TH CENTURY
ORIGIN	SUDAN
WEIGHT	1¼LB (0.55KG)
LENGTH	18¼IN (46.5CM)

KASAI COPPER DAGGER

Originating from the Kasai region of what is now the Democratic Republic of Congo, the distinctive style of this copper-bladed dagger seems potentially influenced by models from the Islamic world. The hilt is well shaped to form a comfortable grip.

DATE	c.1900
ORIGIN	DR CONGO

BENIN CEREMONIAL SWORD

Known as an *eben*, this sword is from the West African kingdom of Benin. Traditionally made of iron by Benin's blacksmiths' guilds, *eben* were carried by the Oba, the state's sacred ruler, and by his chief warriors.

DATE	c.1900
ORIGIN	BENIN
LENGTH	17¾IN (45CM)

ORNATE CEREMONIAL SWORD

This sword belonged to Kofi Karikari, ruler of the West African Asante kingdom from 1867 to 1874. It was an object of prestige rather than a weapon—its iron blade is unsharpened. The golden balls, representing seeds, are symbols of wealth and fertility.

DATE	c.1870
ORIGIN	ASHANTI

BENIN CHIEF WITH EBEN
The kingdom of Benin flourished from the 15th to the 19th century. This bronze panel, produced by Benin craftsmen, shows a chief with an *eben,* the ceremonial sword raised in his right hand, which is a gesture of allegiance to the authority of the Oba, or king. The Oba himself carried an *eben* in ceremonial dances honoring his ancestors, touching it to the ground in front of his father's tomb. *Eben* continued to be made into the 20th century.

Broad ridge

Curved iron blade sharpened on both edges

Curved metal blade

Twin-pointed blade

Leaf-shaped blade

Ridged handle

Straight tapering blade

Punched decoration

Unsharpened iron blade

THROWING KNIFE

Eccentrically shaped multi-bladed throwing knives are found in many parts of Africa. This example is from the Congo. When the knife is thrown it turns about its center of gravity, making the blades scythe dangerously through the air. It will inflict a wound on an opponent whatever its point of impact.

DATE LATE 19TH/EARLY 20TH CENTURY
ORIGIN DEM REP CONGO

BAYONETS AND KNIVES 1914–1945

EUROPEAN ARMIES ENTERED World War I with faith in the bayonet charge as the key to victory in infantry combat. Reality proved different: troops advancing with bayonets fixed were mown down by machine guns and rifle fire. Soldiers cynically claimed that bayonets were more use for opening cans than for combat. However, bayonets have remained in use since, typically with shorter blades. Fighting knives, which proved their worth in the trenches in 1914–18, were used by special forces in World War II, and as a close-combat arm for infantry lacking bayonets.

FULL VIEW

BRITISH KNUCKLE-DUSTER KNIFE

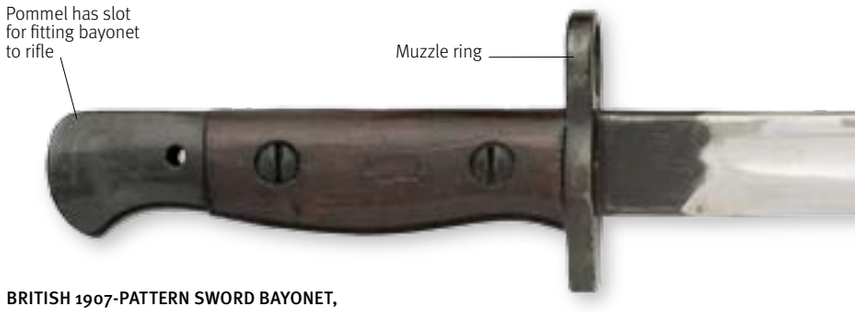
This knife was used by British special forces in the Mediterranean theater during World War II. Cast from a single piece of brass, the hilt has four protruding studs that form a knuckle-duster for punching. The blade has a single cutting edge that sweeps upwards to the point. The shape of the grip makes this a knife for upward stabbing, rather than slashing.

DATE	c.1943
ORIGIN	UK
WEIGHT	1 LB (0.45 KG)
LENGTH	11¾ IN (30 CM)

GERMAN KNIFE BAYONET

Used on the Western Front toward the end of World War I, this short, double-edged bayonet was fitted to the Mauser Gewehr 1898 rifle, attaching to the barrel by a press stud. The knife bayonet was not official German army equipment, but troops were permitted to buy it. Many did, since it also doubled as a highly effective trench knife.

DATE	1914–18
ORIGIN	GERMANY
WEIGHT	½ LB (0.22 KG)
LENGTH	10¼ IN (26.1 CM)



BRITISH 1907-PATTERN SWORD BAYONET,

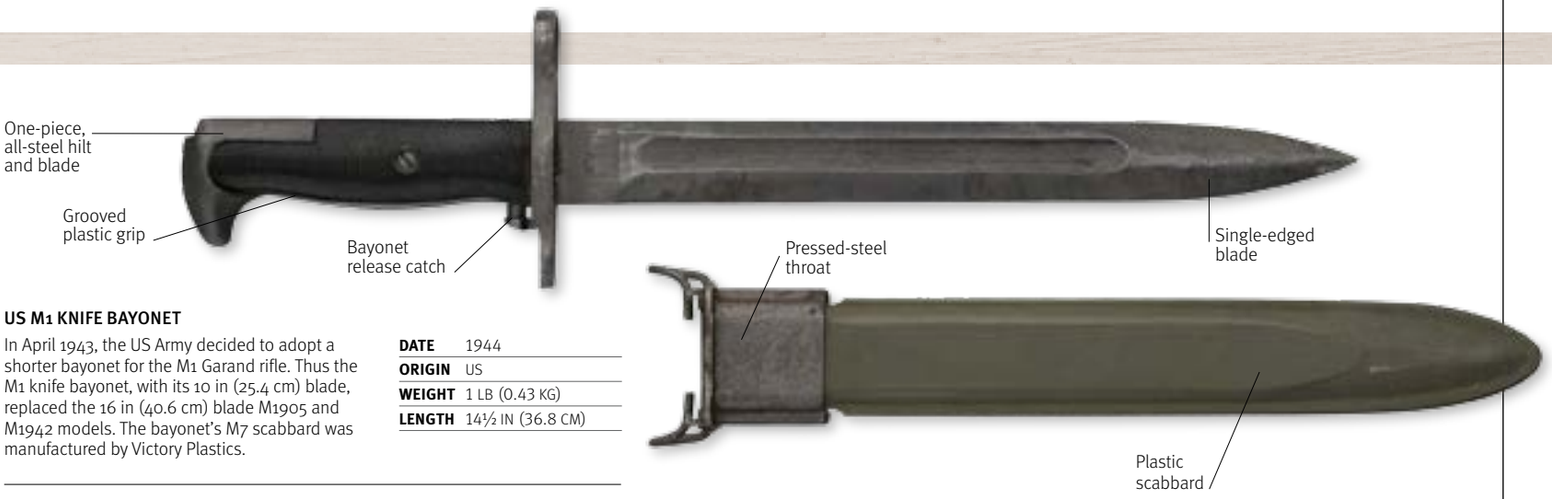
Designed for the Short Magazine Lee-Enfield rifle, the 1907-Pattern was based on the Japanese Arisaka bayonet. Its long blade was meant to give a soldier extra reach, but in the trench warfare of 1914–18 it proved unusable when detached as a sword, and less apt as a bayonet than shorter blades.

DATE	1914–18
ORIGIN	UK
WEIGHT	1¼ LB (0.51 KG)
LENGTH	22 IN (56 CM)

AMERICAN KNUCKLE-DUSTER TRENCH KNIFE

The US Mark 1 1918 knuckle knife was intended as a World War I "trench-clearing tool," but arrived too late for use on the Western Front. Winning fame as a World War II paratroop weapon, it had three attack modes: striking an opponent's skull with the pommel nut, punching him with the knuckle-duster, and stabbing upward with the blade.

DATE	1940s
ORIGIN	US
WEIGHT	1¼ LB (0.5 KG)
LENGTH	22 IN (56 CM)



US M1 KNIFE BAYONET

In April 1943, the US Army decided to adopt a shorter bayonet for the M1 Garand rifle. Thus the M1 knife bayonet, with its 10 in (25.4 cm) blade, replaced the 16 in (40.6 cm) blade M1905 and M1942 models. The bayonet's M7 scabbard was manufactured by Victory Plastics.

DATE	1944
ORIGIN	US
WEIGHT	1 LB (0.43 KG)
LENGTH	14½ IN (36.8 CM)

GERMAN S84/98 BAYONET

This bayonet was introduced in 1915 as a cheap and sturdy attachment for the Mauser Gewehr 1898 rifle. It has no muzzle ring, being held to the rifle solely by a long groove in the pommel. S84/98's continued to be produced up to World War II, which is when this example was made.

DATE	1940s
ORIGIN	GERMANY
WEIGHT	1 LB (0.42 KG)
LENGTH	15 IN (38.2 CM)

AMERICAN MK 3 FIGHTING KNIFE

In 1943 the US Army introduced the Mk 3 knife for hand-to-hand fighting. It was rapidly put into mass production, with 2.5 million manufactured by 1944. The hilt and blade were influenced by the British Fairbairn-Sykes fighting knife (below). The US Marines instead adopted the Ka-Bar combat knife.

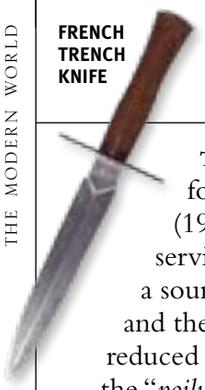
DATE	c.1950
ORIGIN	US
WEIGHT	½ LB (0.24 KG)
LENGTH	11 IN (29.5 CM)

FAIRBAIRN-SYKES FIGHTING KNIFE

Modeled on daggers used by Chinese gangsters, this knife was developed in the 1930s by Shanghai police chief William Fairbairn and his colleague Eric Sykes. In World War II, it was used by Allied special forces such as Commandos, who were also trained by Fairbairn and Sykes in hand-to-hand combat.

DATE	1941–45
ORIGIN	UK
WEIGHT	½ LB (0.23 KG)
LENGTH	12 IN (30 CM)

WORLD WAR I
The opposing lines on the Western Front during World War I stretched from the Swiss border to the North Sea. These troops from the Kriegsmarine (German navy), armed with Mauser Gew98 rifles, occupied defensive positions at its northern extremity.



FRENCH WWI INFANTRYMAN

THE FRENCH CONSCRIPT infantryman who fought on the Western Front in World War I (1914–18) was a citizen-soldier, taught to regard service in the army as his duty to the republic and a source of patriotic pride. Despite immense losses and the demoralizing attrition of trench warfare, which reduced parts of the French army to mutiny in 1917, the "*poilu*" (French slang for "hairy one") held firm in the great battles of the Marne and Verdun.

CITIZEN ARMY

Before the war, every young Frenchman was obliged to undertake national service lasting two years (raised to three in 1913), after which he passed into the reserve for the rest of his adult life. As a result, France could theoretically regard all of its male population as trained soldiers. More than 8 million served at some time in the war with, at the peak, 1.5 million Frenchmen in service. The French army began the war with an antiquated rifle, inadequate machine guns, little heavy artillery, and bright uniforms that made perfect targets. Thus equipped, soldiers were committed to the offensive against overwhelming German firepower. Approximately 1 million French casualties were suffered in the first three months of the war, although the defeat of the Germans at the First Battle of the Marne ensured France's survival. Trench warfare followed, a natural consequence of the defensive superiority that rapid-fire rifles and machine guns gave to entrenched troops. French infantry suffered even worse conditions than their British allies, subjected to artillery bombardment and poison gas in generally poor quality trenches. Morale survived the slaughter at Verdun, but futile offensives in early 1917 brought widespread unrest. The authorities were forced to improve food and leave, and be less wasteful of men's lives. Morale recovered sufficiently for the French infantry to make a major contribution to victory in 1918.

FRENCH INFANTRYMEN FIGHTING AT VERDUN
In February 1916 the Germans attacked the fortified city of Verdun, aiming to "bleed the French army white." Pounded by German heavy artillery, French infantry held the front through months of desperate defensive fighting at a cost of around 400,000 casualties.

TRENCH UNIFORM
The French infantry's original blue overcoats, bright red pants, and cloth kepis were replaced in 1915 by this more discreet blue-gray uniform and steel helmet.

MACHINE GUN CREW
French infantry operate a Hotchkiss machine gun in 1915. France's guns were generally of inferior performance—this Hotchkiss is being fed with 25-round strips of ammunition, rather than having a more efficient belt feed.

COST OF THE WAR

Out of 8.3 million French soldiers who served in the Great War, almost 1.4 million were killed. Another 3 million were wounded, around three-quarters of a million suffering permanent or long-term disability. More than one in five of all Frenchmen was a casualty and the percentage of men between 18 and 35 who died was high enough to justify talk of a "lost generation." The terrible losses at Verdun were memorialized by the Ossuary at Douaumont, which contains the remains of hundreds of thousands of unidentified French and German soldiers.

OSSUARY AT DOUAUMONT

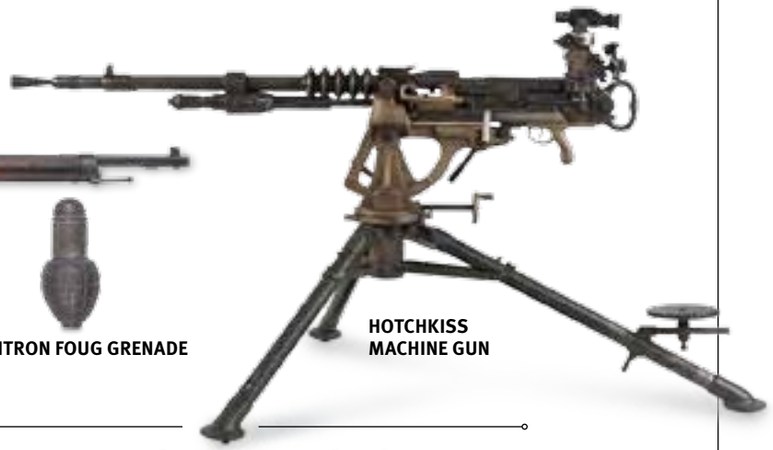
TOOLS OF COMBAT

MANNLICHER-BERTHIER RIFLE

F1 GRENADE

P1 GRENADE

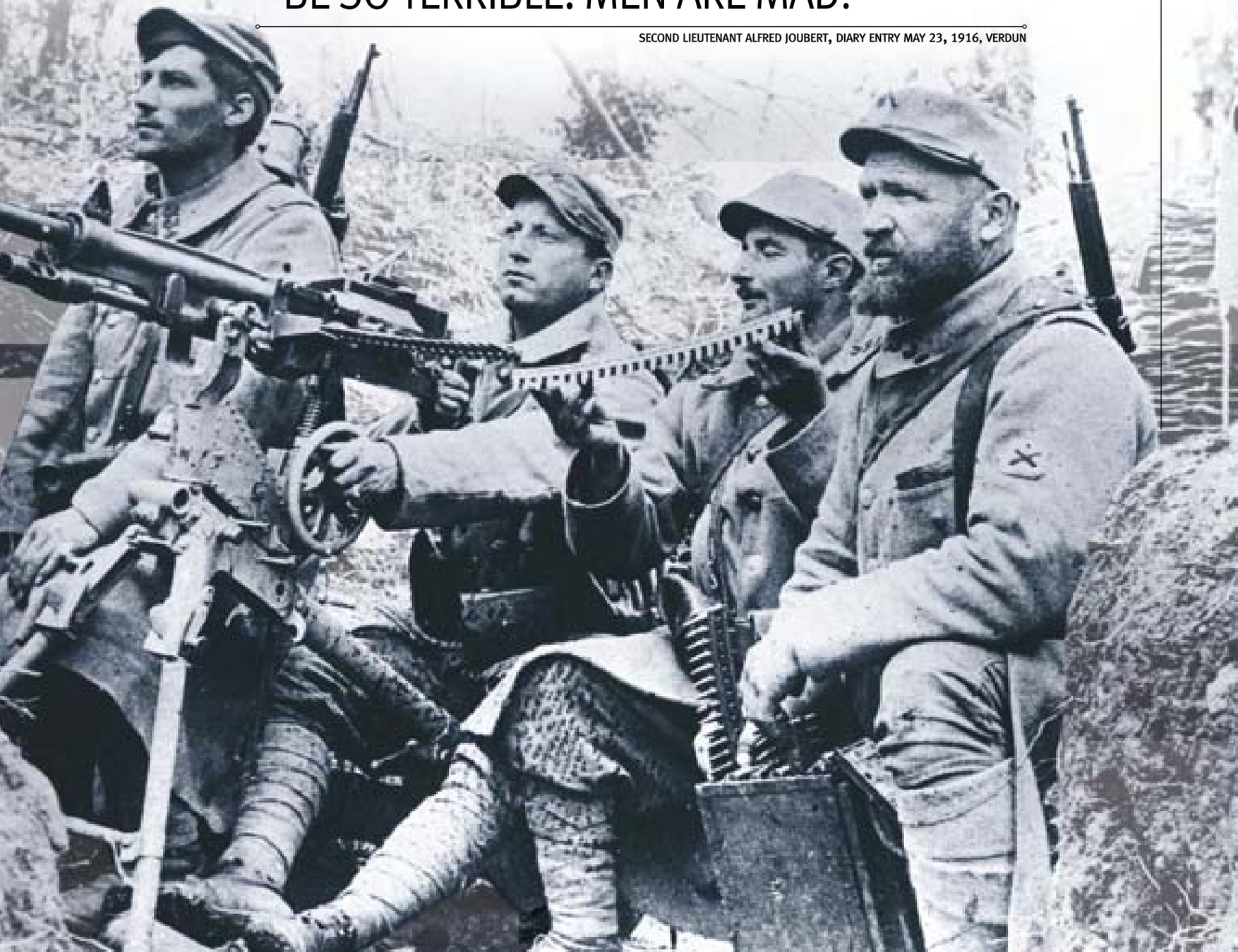
CITRON FOUG GRENADE



HOTCHKISS MACHINE GUN

"HUMANITY IS MAD! WHAT SCENES OF HORROR AND CARNAGE! HELL CANNOT BE SO TERRIBLE. MEN ARE MAD!"

SECOND LIEUTENANT ALFRED JOUBERT, DIARY ENTRY MAY 23, 1916, VERDUN



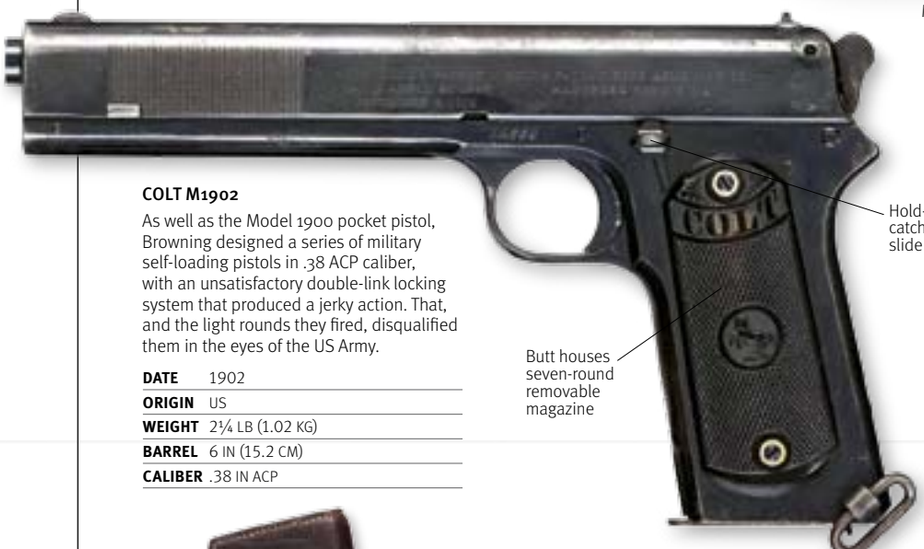
SELF-LOADING PISTOLS 1900–1920

THE BORCHARDT AND THE MAUSER C/96 demonstrated that self-loading pistols worked reliably; however, they were expensive to produce and rather unwieldy. The next generation of such guns became simpler, and thus cheaper to manufacture. The best of the weapons from the early years of the 20th century, such as John Moses Browning's Colt M1911 and Georg Luger's P'08, are still in demand, while originals are eagerly sought by collectors.

COLT M1911A1

Browning designed the Colt M1911 (the year it was accepted as the US Army's official side-arm) in response to a demand by soldiers fighting Moro rebels in the Philippines for a pistol firing the heavy .45 round in place of the less-effective .38-caliber revolvers with which they were issued. The example shown here is a later M1911A1.

DATE	1909 ONWARD
ORIGIN	US
WEIGHT	2 LB (1.1 KG)
BARREL	5 IN (12.7 CM)
CALIBER	.45 IN ACP



COLT M1902

As well as the Model 1900 pocket pistol, Browning designed a series of military self-loading pistols in .38 ACP caliber, with an unsatisfactory double-link locking system that produced a jerky action. That, and the light rounds they fired, disqualified them in the eyes of the US Army.

DATE	1902
ORIGIN	US
WEIGHT	2¼ LB (1.02 KG)
BARREL	6 IN (15.2 CM)
CALIBER	.38 IN ACP

ASTRA M901

A direct copy of the Schnellfeuer ("Rapidfire") version of the Mauser C/96, the Astra was produced in Spain. It has an automatic-fire capability, but is impossible to control in that mode.

DATE	1920s
ORIGIN	SPAIN
WEIGHT	4 LB (2.1 KG)
BARREL	6¼ IN (16 CM)
CALIBER	7.63 MM MAUSER

LUGER P'08

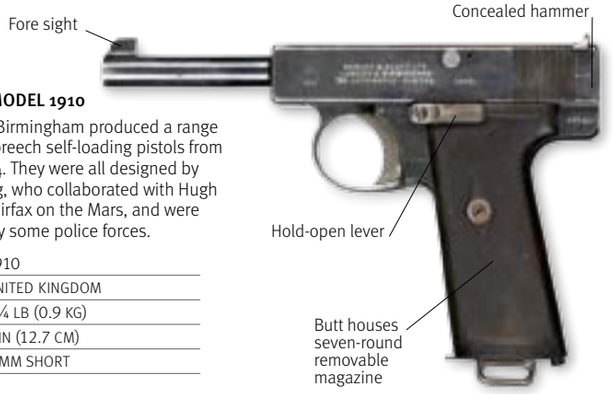
One of the best-known guns in the world, with almost iconic status, the Pistole '08 was designed by Georg Luger in 1900. He copied many features of Borchardt's gun of seven years earlier, but adopted a leaf recoil spring and moved it into the butt, improving the overall balance considerably. Luger also produced improved ammunition for his pistol, the "Parabellum" round, which was to become the world standard.

DATE	1908
ORIGIN	GERMANY
WEIGHT	2 LB (0.8 KG)
BARREL	4 IN (10 CM)
CALIBER	9 MM PARABELLUM

STEYR "HAHN" M1911

Werndl tried for many years to produce a successful military pistol, and succeeded with the M1911. It was similar in concept to the Colt, except that its barrel rotates, rather than tips, to unlock it from the slide.

DATE	1911
ORIGIN	AUSTRIA
WEIGHT	2¼ LB (0.9 KG)
BARREL	9 IN (12.7 CM)
CALIBER	7.63 MM



WEBLEY MODEL 1910

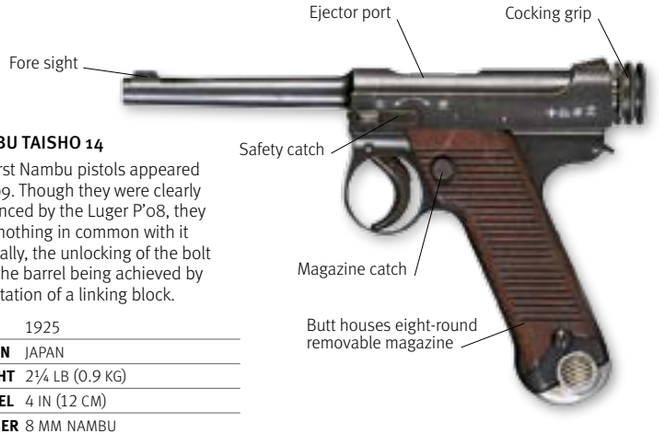
Webley of Birmingham produced a range of locked-breech self-loading pistols from about 1904. They were all designed by J.H. Whiting, who collaborated with Hugh Gabbett-Fairfax on the Mars, and were taken up by some police forces.

DATE	1910
ORIGIN	UNITED KINGDOM
WEIGHT	2¼ LB (0.9 KG)
BARREL	5 IN (12.7 CM)
CALIBER	9 MM SHORT

STEYR-MANNLICHER M1905

Produced by Werndl at Steyr, the M1905 was the last in a series of designs executed by Ferdinand von Mannlicher, who was better known for his rifles. It was complicated and expensive to manufacture, and as a consequence, was short-lived.

DATE	1905
ORIGIN	AUSTRIA-HUNGARY
WEIGHT	2¼ LB (0.9 KG)
BARREL	6 IN (16 CM)
CALIBER	7.63 MM MANNLICHER



NAMBU TAISHO 14

The first Nambu pistols appeared in 1909. Though they were clearly influenced by the Luger P'08, they have nothing in common with it internally, the unlocking of the bolt from the barrel being achieved by the rotation of a linking block.

DATE	1925
ORIGIN	JAPAN
WEIGHT	2¼ LB (0.9 KG)
BARREL	4 IN (12 CM)
CALIBER	8 MM NAMBU

SELF-LOADING PISTOLS 1920–1950

IF THERE WERE ANY LINGERING DOUBTS as to the reliability of the self-loading pistol, they were largely dispelled during World War I, when officers of four of the major participating armies (Austria-Hungary, Germany, Turkey, and the United States) all carried them. Poorly designed models were still being produced, but few of these found their way into military service (the Japanese Type 94 was an exception). The new types generally proved to be worthy successors to masterpieces like the Luger and the Colt M1911.

BROWNING GP35

The High Power (*Grand Puissance*) model, the last Browning design, was taken up by the Belgian Army, and during World War II, plans for it were smuggled to Britain, and it was put into production in Canada. Its basic principle was the same swinging link at the rear of the barrel seen in the M1911, but detailed changes made manufacture cheaper and maintenance easier. It was the first self-loading pistol adopted by the British Army, in 1954.

DATE	1935
ORIGIN	BELGIUM
WEIGHT	2 LB (0.99 KG)
BARREL	4 IN (11.8 CM)
CALIBER	9 MM PARABELLUM

STAR MODEL M

Manufactured by Echeverria in Eibar, the Star was one of the best of many copies of the Colt M1911, though it lacked the grip safety that the Colt had acquired by the mid-1920s. It was produced in a variety of models and calibers until the mid-1980s.

DATE	1932
ORIGIN	SPAIN
WEIGHT	2 LB (1.07 KG)
BARREL	5 IN (12.5 CM)
CALIBER	9 MM LARGO

TOKAREV TT MODEL 1933

The Tokarev TT was the first self-loading pistol on general issue to the Red Army. In design, it was similar to the Browning GP35, with a single swinging-link locking system. It was simple and could be field-stripped without tools. It lacked a safety catch, but could be put at half-cock.

DATE	1933
ORIGIN	USSR
WEIGHT	1¾ LB (0.85 KG)
BARREL	4 IN (11.6 CM)
CALIBER	7.62 MM SOVIET AUTO

RADOM M1935

Wilneiwczyc and Skrzypinski's design for the Radom factory, executed in the early 1930s, was similar in concept to the Browning High Power, but it was more compact and had extra security features. These included a grip safety, plus a device that dropped the hammer and retracted the firing pin, allowing the pistol to be fired safely with one hand.

DATE	1935
ORIGIN	POLAND
WEIGHT	2 LB (1.05 KG)
BARREL	4 IN (11.5 CM)
CALIBER	9 MM PARABELLUM

BERETTA MODEL 1934

Pietro Beretta SpA is one of the world's longest-established gunmakers, with a history spanning four centuries, and a tradition of supplying its nation's army with weapons. Its M1934 was to become the official Italian officer's side-arm during World War II. The design evolved from one executed two decades earlier. Blowback-operated and without any form of locking mechanism, it was restricted to firing a reduced-power round, originally in 7.65 mm caliber.

DATE	1934
ORIGIN	ITALY
WEIGHT	1 LB (0.65 KG)
BARREL	6 IN (15.2 CM)
CALIBER	9 MM SHORT

STECHKIN APS

The Stechkin was an unsuccessful attempt to produce a fully-automatic pistol for use by security forces. Like the Makarov, it was an unlocked blowback design based on the American Walther PP. In automatic mode it was practically uncontrollable.

DATE	1960s
ORIGIN	USSR
WEIGHT	2 LB (1.03 KG)
BARREL	5 IN (12.7 CM)
CALIBER	9 MM MAKAROV

MAKAROV PM

The Tokarev's replacement as the standard Red Army side-arm was a copy of the American Walther PP, with double-action and a two-stage safety device. Its ammunition was about as powerful as could safely be used in a blowback design at that time.

DATE	1950s
ORIGIN	USSR
WEIGHT	1 LB (0.7 KG)
BARREL	3 IN (9.7 CM)
CALIBER	9 MM MAKAROV

SELF-LOADING PISTOLS FROM 1950

THE DUKE OF WELLINGTON questioned the value of the pistol as a weapon of war as long ago as the early 19th century, and as soon as we entered an era of mechanized warfare, the answer became clear: it was of little value except as personal protection and therefore, perhaps, for bolstering morale. Where pistols did prove to be of lasting value, however, was in the field of security and police operations, and a new generation was developed with these applications in mind.

HECKLER & KOCH VP70M

The VP70M, the first pistol to make extensive use of plastic, was another attempt to produce a fully automatic handgun, this time limited to firing three-round bursts. The mechanism that controlled this was housed in the detachable butt stock; when it was removed, the pistol reverted to normal semi-automatic operation.

DATE	1970s
ORIGIN	GERMANY
WEIGHT	3 LB (1.55 KG) INCLUDING STOCK
BARREL	4 IN (11.6 CM)
CALIBER	9 MM PARABELLUM

BERETTA MODEL 92FS

Chosen as the US Military's official side-arm to replace the Colt M1911A1 in the 1980s, the Beretta 92 was a conventional short-recoil design, its frame forged from aluminum to reduce weight. The slide top was cut away to allow single rounds to be loaded manually, should the magazine be lost or damaged.

DATE	1976
ORIGIN	ITALY
WEIGHT	2 LB (0.98 KG)
BARREL	4 IN (10.9 CM)
CALIBER	9 MM PARABELLUM

GLOCK 17

The Glock 17's frame was fabricated entirely from plastic, with four steel rails to act as guides for the metal reciprocating parts. Uniquely, its rifling was hexagonal: a series of six flats linked by small arcs. It used Browning's single swinging-link/tipping-barrel locking system.

DATE	1982
ORIGIN	AUSTRIA
WEIGHT	1 LB (0.6 KG)
BARREL	4 IN (11.4 CM)
CALIBER	9 MM PARABELLUM

HECKLER & KOCH USP

The Universal Service Pistol was Heckler & Koch's answer to the Glock, and it, too, was largely made of plastic and employed the tried-and-tested Browning locking system. The USP was designed to facilitate modification, and could be configured in nine different ways.

DATE	1993
ORIGIN	GERMANY
WEIGHT	1 LB (0.75 KG)
BARREL	4 IN (10.7 CM)
CALIBER	9 MM PARABELLUM

DESERT EAGLE

As befitting a pistol capable of handling the most powerful ammunition, everything about the Desert Eagle was made on a massive scale. Unlike almost all other self-loading pistols, it was gas operated, and of modular design. Its standard frame was able to accept sets of components for different ammunition, from .357 Magnum to .5 Action Express, and barrels of different lengths.

DATE	1983
ORIGIN	ISRAEL
WEIGHT	5 LB (2.66 KG)
BARREL	10 IN (24.5 CM)
CALIBER	.44 MAGNUM

REVOLVERS 1900–1950

MOST OF THE DEVELOPMENT WORK on the revolver had been completed by the 1890s, and all that remained was for the design to be refined. There was little to be done to improve the reliability of such a simple design, but there were potential economies to be achieved in the production process, and this meant lower prices for the end user. In a very competitive marketplace, this often meant the difference between success and failure.

WEBLEY & SCOTT MK VI

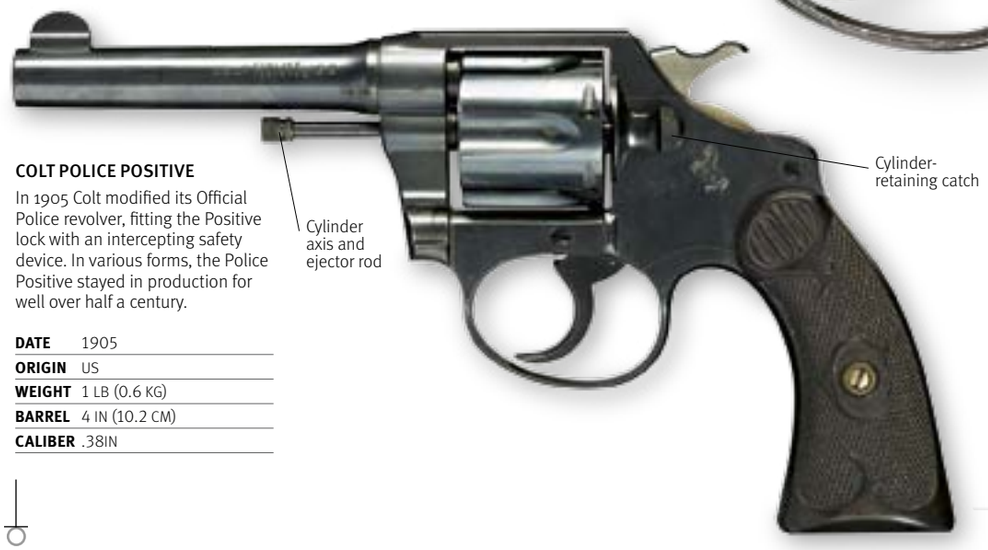
The last in a long line of service revolvers produced by the famous Birmingham partnership, the Mark VI was introduced early in World War I. It retained many of the features of its predecessors, and was renowned for its sturdy reliability.

DATE	1915
ORIGIN	UK
WEIGHT	2 LB (1.05 KG)
BARREL	6 IN (15.2 CM)
CALIBER	.455 ELEY

SMITH & WESSON MILITARY AND POLICE

Having championed the hinged-frame revolver, Smith & Wesson, with the advent of more powerful ammunition, was obliged to switch to a solid frame with a swing-out cylinder for its Military and Police pistol. This was chambered for the long .38 Special round.

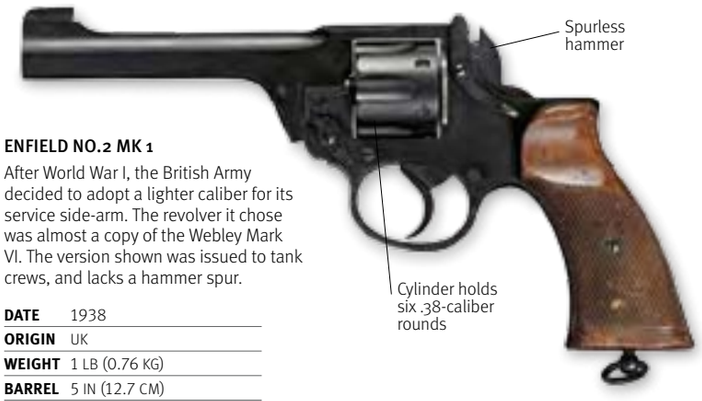
DATE	1900
ORIGIN	US
WEIGHT	1 LB (0.85 KG)
BARREL	5 IN (12.7 CM)
CALIBER	.38 SPECIAL



COLT POLICE POSITIVE

In 1905 Colt modified its Official Police revolver, fitting the Positive lock with an intercepting safety device. In various forms, the Police Positive stayed in production for well over half a century.

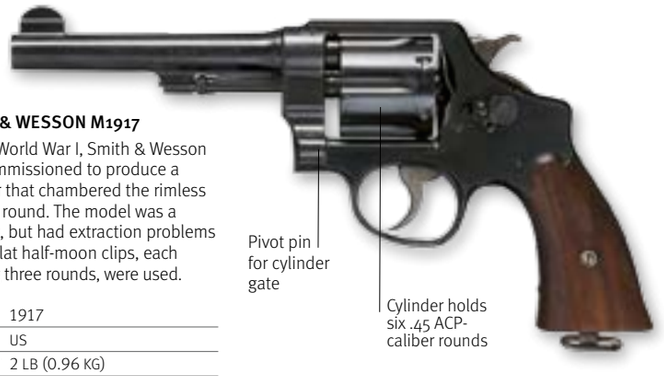
DATE	1905
ORIGIN	US
WEIGHT	1 LB (0.6 KG)
BARREL	4 IN (10.2 CM)
CALIBER	.38IN



ENFIELD NO.2 MK 1

After World War I, the British Army decided to adopt a lighter caliber for its service side-arm. The revolver it chose was almost a copy of the Webley Mark VI. The version shown was issued to tank crews, and lacks a hammer spur.

DATE	1938
ORIGIN	UK
WEIGHT	1 LB (0.76 KG)
BARREL	5 IN (12.7 CM)
CALIBER	.38 IN



SMITH & WESSON M1917

During World War I, Smith & Wesson was commissioned to produce a revolver that chambered the rimless .45 ACP round. The model was a success, but had extraction problems unless flat half-moon clips, each carrying three rounds, were used.

DATE	1917
ORIGIN	US
WEIGHT	2 LB (0.96 KG)
BARREL	5 IN (14.4 CM)
CALIBER	.45 ACP

COLT NEW SERVICE

The Colt New Service was the last standard-issue service revolver produced by Colt for the US Army. Unbreakable under normal conditions, it had a solid-frame design with a swing-out cylinder. The British Army also bought them in great numbers, chambered, like this example, for the .455 Eley round.

DATE	1907
ORIGIN	US
WEIGHT	2 LB (1.15 KG)
BARREL	5 IN (14.4 CM)
CALIBER	.455 ELEY

THE ICONIC REVOLVER
From the earliest Hollywood westerns to the latest TV cop shows, the revolver has become an icon of civilian law enforcement.

REVOLVERS FROM 1950

BY THE 1950S it was widely accepted that the self-loading pistol, with its ease of operation and much greater capacity, had finally rendered the revolver obsolete. Around the same time, however, new and much more powerful ammunition types (the so-called Magnum rounds) were being produced. The trouble was that the Magnum used almost twice the energy of a traditional round, and this was far more than a self-loading pistol could handle safely. For this reason, the revolver was given a new lease on life.

MAGNUM PISTOLS
Pistols chambered for Magnum rounds are widely used among police forces. From here they have made their way into popular culture via such movies as *Magnum Force* (1973).

SMITH & WESSON MODEL 27
Smith & Wesson produced a huge variety of pistols chambered for the various Magnum calibers—.357 and .44 are only the most common—on light, intermediate, and heavy frames. The heavy Model 27, in .357 caliber, was the most popular model, and was produced with 4 in (10.2 cm), 6 in (15.2 cm), and 8 in (21.3 cm) barrels. The Model 29, in .44 caliber, was almost identical, but was produced with a 10 in (27 cm) barrel.

DATE	1938 ONWARD
ORIGIN	US
WEIGHT	3 LB (1.4 KG)
BARREL	11 IN (30 CM)
CALIBER	.357 MAGNUM

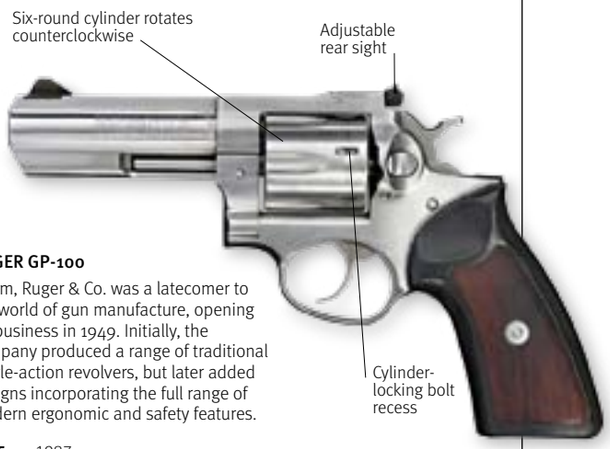
SMITH & WESSON AIRWEIGHT
As well as the giant Magnums, most gunmakers produced "pocket" revolvers. These were lighter in weight than semi-automatic pistols chambered for the same ammunition, and were easier to conceal. Smith & Wesson's Centennial range, which included the Airweight, carried five rounds and had shrouded hammers.

DATE	1952 ONWARD
ORIGIN	US
WEIGHT	84 LB (38 KG)
BARREL	2 IN (5 CM)
CALIBER	.38 SPECIAL

COLT PYTHON

Colt lost no time in producing its own Magnum pistols, based on the tried-and-tested New Service and Single-Action Army models, but it was the 1950s before it produced an all-new purpose-designed Magnum revolver; the Python. Other Magnum "snakes" (the Cobra, the King Cobra, and the Anaconda, the latter in .44 caliber) were to follow, and all have been kept up to date. The ventilated barrel rib has become a feature of these heavy revolvers.

DATE	1953 ONWARD
ORIGIN	US
WEIGHT	3 LB (1.4 KG)
BARREL	8 IN (20.3 CM)
CALIBER	.357 MAGNUM



RUGER GP-100

Sturm, Ruger & Co. was a latecomer to the world of gun manufacture, opening for business in 1949. Initially, the company produced a range of traditional single-action revolvers, but later added designs incorporating the full range of modern ergonomic and safety features.

DATE	1987
ORIGIN	US
WEIGHT	2 LB (1.05 KG)
BARREL	4 IN (10.2 CM)
CALIBER	.357 MAGNUM

CHARTER ARMS UNDERCOVER

Charter Arms began trading in 1964, and the Undercover was its first product. It was intended to be easily concealed, and being chambered for .38 Special ammunition it had plenty of stopping power.

DATE	1964
ORIGIN	US
WEIGHT	1 LB (.45 KG)
BARREL	2 IN (5 CM)
CALIBER	.38 SPECIAL

CHARTER ARMS POLICE BULLDOG

Built on a heavier frame than the Undercover, the Police Bulldog was also available with a 2 in (6.5 cm) barrel, chambered for .357 Magnum or .44 Special ammunition. The molded rubber grips helped reduce the "felt" recoil.

DATE	1971
ORIGIN	US
WEIGHT	1 LB (0.6 KG)
BARREL	4 IN (10.1 CM)
CALIBER	.357 MAGNUM

MANUALLY LOADED REPEATER RIFLES

THE MAIN DIFFERENCE between the rifles used during the Boer War and those used in World War I lay in the length of their barrels. At the turn of the century, the barrels of infantry rifles were 29½ in (75 cm) long. By 1914, some had been shortened by 4 in (10 cm), and the rest were soon to follow. The exception was France, where the barrel of the Berthier rifle, introduced into service in 1916, had actually increased in length.

SPRINGFIELD M1903

Impressed by the Mauser rifles US troops encountered during the war against Spain, the United States Ordnance Department looked to replace its Krag rifles. Negotiating a license to build a Mauser design of its own, the result was the .30 in Rifle, Magazine, M1903. The example shown here has an experimental 25-round magazine.

DATE	1903
ORIGIN	US
WEIGHT	8½ LB (4 KG)
BARREL	24 IN (61 CM)
CALIBER	.30-03 (LATER .30-06)

PATTERN 1914

At the start of World War I, manufacturing problems with the new Pattern 1913 rifle resulted in a change of caliber from 0.276 in to the standard 0.303 in chambering, and the weapon's redesignation as the Pattern 1914. The Model 1917, a 0.30 in-caliber version of the Pattern 1914, was later adopted by the US Army.

DATE	1914
ORIGIN	UK
WEIGHT	8½ LB (4 KG)
BARREL	26 IN (66 CM)
CALIBER	7 MM MAUSER (.30-06)

BERTHIER MLE 1916

The shortcomings of the Lebel rifle led to a revised design being issued to French colonial troops in 1902. Though it continued to use the bolt action of the Lebel, and was outmoded in appearance (due to the length of its barrel), its only serious defect lay in its magazine capacity—just three rounds. A modified version with a five-round magazine was issued from 1916.

DATE	1916
ORIGIN	FRANCE
WEIGHT	9 LB (4.15 KG)
BARREL	31¼ IN (79.8 CM)
CALIBER	8 MM x 50R

MOSIN-NAGANT CARBINE M1944

In 1910, the 3-line Mosin-Nagant rifle was modified to produce a carbine by shortening its barrel. In 1938 it was revamped, largely to make it cheaper to manufacture, and in 1944 it attained its final form with the addition of a folding cruciform bayonet. Though it was obsolete by that time, the People's Republic of China began manufacturing copies in 1953.

DATE	1944
ORIGIN	USSR
WEIGHT	8½ LB (3.9 KG)
BARREL	20¼ IN (51.7 CM)
CALIBER	7.62 MM x 54R

MAUSER KAR98K

The "Karabiner" 98K embodied improvements to the Mauser Gewehr 98 rifle, and became the standard German service rifle of World War II. More than 14 million were manufactured between 1935 and 1945. A number of variations were produced, including those for mountain troops, paratroops, and snipers. During the war, the original design was simplified to speed up production.

DATE	1935
ORIGIN	GERMANY
WEIGHT	8½ LB (3.9 KG)
BARREL	23½ IN (60 CM)
CALIBER	7.92 MM x 57

FULL VIEW

LEE-ENFIELD RIFLE NUMBER 4 MARK 1

The new Lee-Enfield, which appeared late in 1939, differed very little from the model it replaced. The bolt and receiver were modified; the rear sight was a new design, and was placed on the receiver; the fore stock was shortened, exposing the muzzle, and its cap was redesigned. The Number 4 remained in service until 1954.

DATE	1939
ORIGIN	UK
WEIGHT	9 LB (4.1 KG)
LENGTH	25 IN (64 CM)
CALIBER	.303 IN

RED ARMY INFANTRYMAN

TT TOKAREV 1933 PISTOL

WHEN THEY INVADED the Soviet Union in June 1941, the Germans planned for a swift victory—completely underrating the endurance and resilience of the Soviet conscript soldier. The Soviet way of making war was immensely wasteful of men's lives, thrown away in ill-considered offensives or committed to "no retreat" when on the defensive. Yet the Red Army infantryman remained firmly committed to the struggle, either as a dedicated communist or as a patriot fighting in defense of the homeland.

HARSH DISCIPLINE

The Red Army infantryman was subject to harsh discipline by his officers, who themselves were under surveillance by political commissars and Soviet dictator Joseph Stalin's secret police, the NKVD. Officers and men alike were subject to arbitrary arrest. Men accused of political dissent or cowardice were put in the forefront of battle in suicide squads.

The Red Army suffered an average of 8,000 casualties a day through nearly four years of war —heavier losses per day than the Russian Empire had experienced in World War I. Yet after the initial disasters of 1941, morale never seriously wavered. The scale of early losses meant that the Red Army became largely a mix of the young, arriving at military age from 1941 onward, and those initially considered too old for service. But they held firm in front of Moscow in the bitterly cold winter of 1941–42 and, after further costly defeats, carried off the victory at Stalingrad that turned the tide. In the later stages of the war, better equipped and well led, the Soviet infantry showed initiative in mobile offensives, rolling the Germans all the way back to Berlin.

INFANTRY ACTION
Soviet infantry advance as one of their number loads a mortar. Early in the war, Red Army soldiers were frequently ordered forward with bayonets fixed in the face of machine gun or artillery fire that made attack suicidal. From 1943 better equipment and more sensible leadership cut losses sharply.

TOOLS OF COMBAT

TT TOKAREV 1933 PISTOL

BATTLE OF STALINGRAD

The epic struggle for the Soviet city of Stalingrad was one of the turning points of World War II. From September 1942, heavily outnumbered Red Army soldiers resisted the German capture of the city, fighting house by house and street by street, until a counter-offensive in late November left the German forces encircled. After two agonizing, bitterly cold winter months under siege by the Red Army, the German commander finally surrendered on January 30, 1943.

SOVIET SOLDIERS AT STALINGRAD

> "OUR AIM IS TO DEFEND SOMETHING GREATER THAN MILLIONS OF LIVES... THE MOTHERLAND."

SOVIET SOLDIER, DIARY ENTRY, JULY 1941

SOVIET UNIFORM
Like all World War II infantry uniforms, Red Army outfits were drab for camouflage purposes and distinguished Soviet soldiers from others only by an accumulation of details. Soviet infantry helmets, for example, broadly resembled the American M1 helmet in shape.

SOVIET SNIPER
A young Red Army marksman peers through the sight of his 7.62 mm Mosin-Nagant M91/30 sniper rifle. This was simply the Soviets' standard bolt-action rifle accuratized and fitted with a telescopic sight. The Red Army made extensive use of snipers during World War II and "top guns" such as Vasili Zaitsev—credited with killing more than 149 German soldiers—were lauded as Soviet heroes.

MOSIN-NAGANT 1891/30 RIFLE

TOKAREV SVT40 RIFLE

SELF-LOADING RIFLES 1914–1950

THE FIRST SUCCESSFUL self-loading rifle was developed by a Mexican, Manuel Mondragon, as early as 1890. Taken up by the Mexican Army in 1908, it proved too fragile for general use. Next, in 1918, came John Browning's Automatic Rifle, but this came to be used as a light machine gun instead because of its excessive weight. It was not until 1936 that a truly practical self-loading rifle, the M1, was adopted by the US Army. Further breakthroughs in self-loading rifles came in World War II. The best of these was the Sturmgewehr G44, but it was some time before the "intermediate" ammunition round, its most important design aspect, achieved universal acceptance.

TOKAREV SVT40

Fedor Tokarev designed a self-loading rifle with a tilting bolt locking into the floor of the receiver, and had it accepted by the Red Army in 1938. Two years later, he produced a more robust weapon that was cheaper and quicker to manufacture. The Samozaryadnaya Vintovka Tokarev 40 was issued to non-commissioned officers, though some were employed as sniper rifles.

DATE	1940
ORIGIN	USSR
WEIGHT	8 LB (3.9 KG)
BARREL	25 IN (61 CM)
CALIBER	7.62 MM x 54R

M1 CARBINE

Designed as a replacement for the pistol and rifle, the M1 was issued from 1942. It was chambered for an intermediate round developed by Winchester, and had an action similar to that of the Garand, except it had a short-stroke gas piston. It was also produced with a folding butt, for issue to paratroopers.

DATE	1942
ORIGIN	US
WEIGHT	9 LB (4.35 KG)
LENGTH	20 IN (55.8 CM)
CALIBER	.30 IN

GEWEHR 43

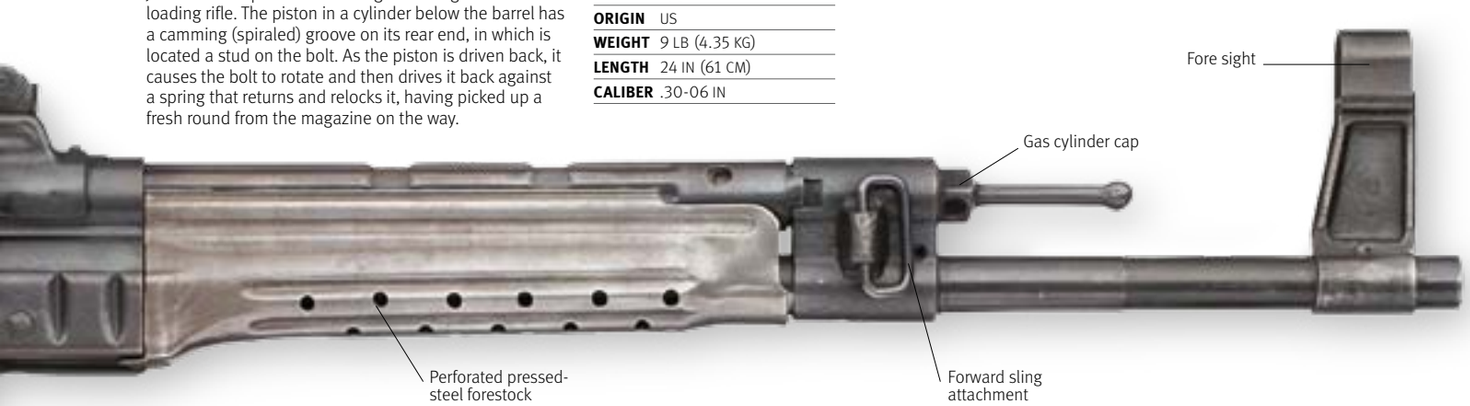
Soon after the start of World War II, the German army began demanding a self-loading rifle. Walther's original design employed a cup at the muzzle that unlocked the bolt and cycled the action. In 1943 a modified version, using the same action but with a conventional gas cylinder and piston mounted above the barrel, was introduced as the Gewehr 43.

DATE	1943
ORIGIN	GERMANY
WEIGHT	9 LB (4.35 KG)
BARREL	20 IN (55.8 CM)
CALIBER	7.92 MM x 57

M1 GARAND RIFLE

John Garand opted for a rotating bolt design for his self-loading rifle. The piston in a cylinder below the barrel has a camming (spiraled) groove on its rear end, in which is located a stud on the bolt. As the piston is driven back, it causes the bolt to rotate and then drives it back against a spring that returns and relocks it, having picked up a fresh round from the magazine on the way.

DATE	1932
ORIGIN	US
WEIGHT	9 LB (4.35 KG)
LENGTH	24 IN (61 CM)
CALIBER	.30-06 IN



STURMGEWEHR 44

In 1940 work began on a selective-fire rifle chambered for a new intermediate 7.92 mm x 33 round. The result was a gas-operated weapon with a tipping bolt, which was put into production as the Maschinen Pistole 43 and later renamed the Sturmgewehr 44. Small numbers were fitted with the Krummlauf, a barrel extension that turned the bullet through 30°, for use by tank crews against infantry.

DATE	1943
ORIGIN	GERMANY
WEIGHT	11 LB (5.1 KG)
LENGTH	16 IN (41.8 CM)
CALIBER	7.92 MM x 33

FULL VIEW

AK47 ASSAULT RIFLE

DESIGNED BY MIKHAIL KALASHNIKOV, a young tank commander with little formal training, the assault rifle that bears his name was to achieve iconic status due to its rugged simplicity. Kalashnikov's first successful design, the AK47 was simple, handled well, and operated satisfactorily under virtually any conditions. It was adopted by the Soviet Army in 1949, and since then, between 50 and 70 million Kalashnikov-type rifles and light machine guns have been manufactured all over the world.

AK47

Early AK47s were made largely from welded components, stampings, and pressed metal parts. However, problems arose, and from 1951, sturdier receivers machined from forged steel billets were introduced. The modified AKM was not only much lighter than the original AK47, but it also had a reduced cyclic rate of full automatic fire, which improved its accuracy. The AKM can be distinguished from the AK47 by the strengthening ribs in the top surface of the receiver.

DATE	1951
ORIGIN	USSR
WEIGHT	9½ LB (4.3 KG)
BARREL	16¼ IN (41.5 CM)
CALIBER	7.62 MM x 39

FULL VIEW

MUJAHIDEEN WARRIOR

Now mass-produced on a global scale, the AK47 has become the most popular gun in the world. Here it is seen in the hands of a Mujahideen warrior in Afghanistan.

AMMUNITION

It is generally believed that the design for the 7.62 mm x 39 cartridge was based on an examination of the ammunition used by the German MP43/MP44 in World War II. But Soviet designers had also been looking into the problems of producing their own intermediate cartridge to increase the combat efficiency of their submachine guns. The result was the 7.72 mm x 39 M43, a rimless, bottle-necked cartridge with a copper-washed steel case that remains practically unchanged in use around the world today.

SELF-LOADING RIFLES 1950–2006

ONE VITAL TACTICAL LESSON learned during World War II was the importance of firepower in the final phase of an assault. As a result, bolt-action weapons soon fell out of use, except as a sniper's arm, and the self-loading rifle became ubiquitous. Following the lead of the Sturmgewehr 44, introduced in 1943, the new weapons of the post-war era were capable of fully-automatic fire. The Sturmgewehr 44 also embodied another key development: the use of lighter, smaller, "intermediate" ammunition rounds, which eventually replaced those that had been in use since the start of the 20th century.

M14

In 1953, the North Atlantic Treaty Organization's (NATO) armies adopted a new full-power rifle cartridge, in 7.62 mm caliber. To accommodate it, the US developed a version of Garand's 20-year-old M1, endowed with a fully automatic fire capability and a larger magazine.

DATE	1957
ORIGIN	US
WEIGHT	8½ LB (3.9 KG)
BARREL	22 IN (55.8 CM)
CALIBER	7.62 MM x 51 NATO

L1A1

The L1A1 was introduced in 1954, and was the standard British service rifle until its replacement by the L85A1 in 1988. It was adapted from the Belgian FN FAL, but with minor changes to the specifications to facilitate manufacture in the UK.

DATE	1954
ORIGIN	UK
WEIGHT	9½ LB (4.3 KG)
BARREL	21 IN (53.3 CM)
CALIBER	7.62 MM x 51 NATO

GALIL ASSAULT RIFLE

After the 1967 war, Israeli Military Industries was ordered to produce something similar to the AK47. It chose a design by Israel Galil, a near-copy of the Finnish Valmet M62, itself an AK47 derivative, but opted for the American 5.56 mm x 45 round.

DATE	1974
ORIGIN	ISRAEL
WEIGHT	9½ LB (4.35 KG)
BARREL	18 IN (46 CM)
CALIBER	5.56 MM x 45 NATO

HECKLER & KOCH G41

The G41 was an updated version of the G3, and shared its roller-delayed blowback action. The modifications were necessary to accommodate the 5.56 mm round, and other standard NATO features such as the universal sight mounting and magazine.

DATE	1987
ORIGIN	GERMANY
WEIGHT	4 KG (9 LB)
BARREL	45 CM (17½ IN)
CALIBER	5.56 MM x 45 NATO

STONER M63

This M63 by Eugene Stoner is a modular design, and its 15 basic sub-assemblies can be put together in six different ways to produce a submachine gun, a carbine, an assault rifle (shown here), an automatic rifle, a light machine gun, and a general-purpose machine gun.

DATE	1962
ORIGIN	US
WEIGHT	7¾ LB (3.52 KG)
BARREL	20 IN (50.8 CM)
CALIBER	5.56 MM x 45 NATO

FULL VIEW

STONER M16A1

Stoner's Armalite AR-15 was accepted by the US Air Force in the early 1960s, and subsequently taken into service as the M16. The M16A1 was fitted with a bolt-closing device and a revised flash hider. The later M16A2 acquired a three-round burst, and a heavier barrel with modified rifling better suited to the SS109 5.56 mm round, instead of the M193 for which it was designed.

DATE	1982
ORIGIN	US
WEIGHT	8 LB (3.6 KG)
BARREL	20 IN (50.8 CM)
CALIBER	5.56 MM x 45 NATO

L85A1

The L85A1 was the last weapon system to be developed and produced at the Royal Smallarms Factory, Enfield, UK, before it closed in 1988. It was dogged with problems during the development stage, and trials continued even after its adoption in 1985. It was designed from the start to use an optical sight. The body and many other parts are steel samplings. All the furniture is high-impact plastic.

DATE	1985
ORIGIN	UK
WEIGHT	11LB (4.98KG)
BARREL	20½IN (51.8CM)
CALIBRZ	5.56MM x 45 NATO

SA80 ASSAULT RIFLE

DURING THE LAST QUARTER of the 20th century, a new type of assault rifle, the "bullpup," began to enter service with the world's armies. The bullpup configuration places the action in the butt, with the magazine behind the trigger, allowing a full-length barrel to be accommodated in a much shorter weapon. Three bullpup rifles have been adopted so far: the French FAMAS, the Austrian AUG, and the British L85 Individual Weapon (shown here), part of the SA80 weapon family, which also includes the L86 Light Support Weapon and the L98 Cadet Rifle.

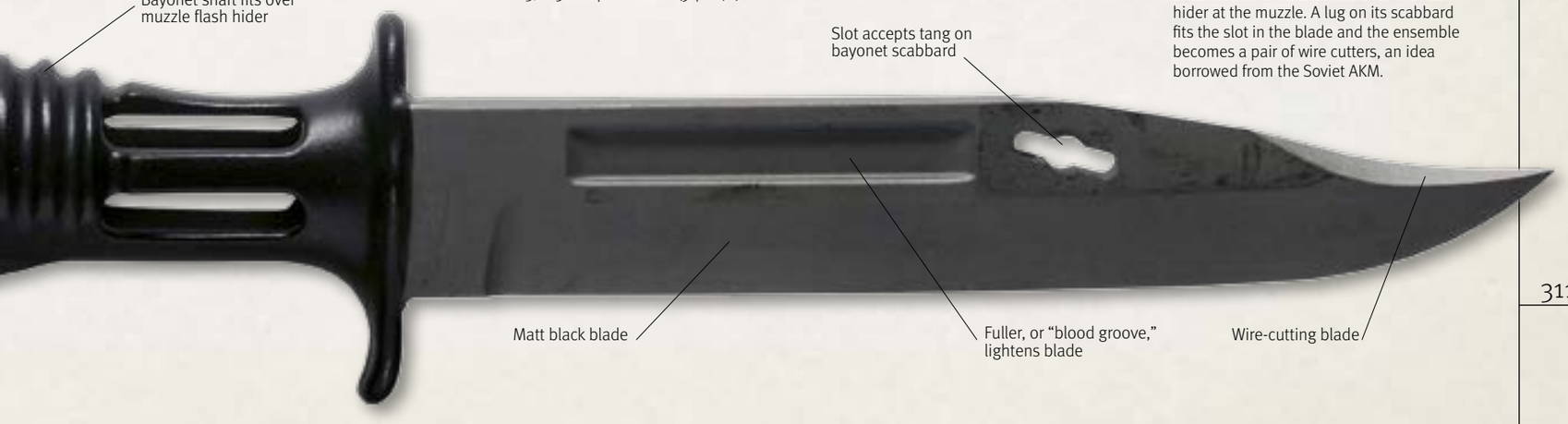
FULL VIEW

AMMUNITION

The SA80 weapon family was designed around the NATO-standard SS109 5.56mm round, which has a steel-tipped projectile weighing 61.7 grains (4g) and achieves a muzzle velocity of 3,085 feet per second (940m/s).

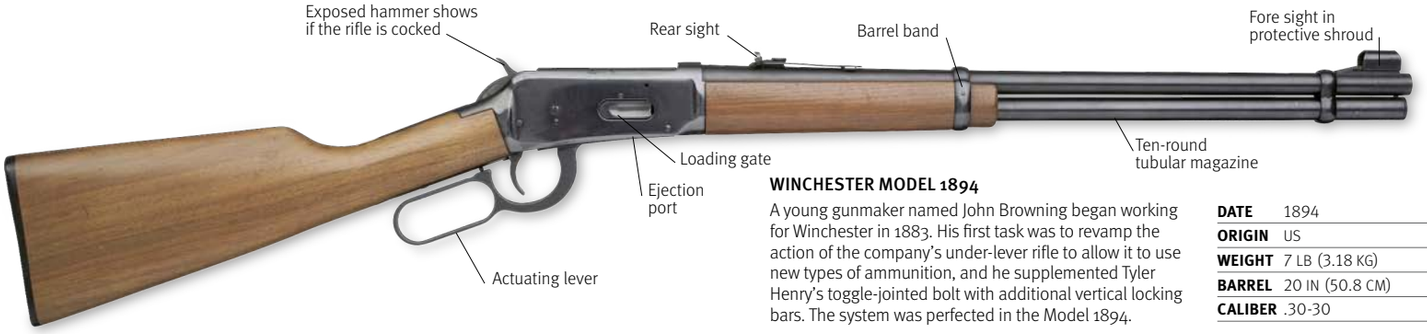
BAYONET

The bayonet supplied with the LA85 is unusual in that its shaft fits over the flash-hider at the muzzle. A lug on its scabbard fits the slot in the blade and the ensemble becomes a pair of wire cutters, an idea borrowed from the Soviet AKM.



SPORT GUNS

BY THE LAST DECADE of the 19th century, most of the technology found in modern firearms was already present. Later developments addressed concerns over safety (particularly in respect to the more powerful ammunition made possible by new formulations of propellant) and economy of manufacture. There was another, and this time quite new, element coming into consideration: during the previous century, little thought had been given to the ergonomic design of firearms, but this was now being addressed in some quarters, particularly in the design of sport guns.



WINCHESTER MODEL 1894

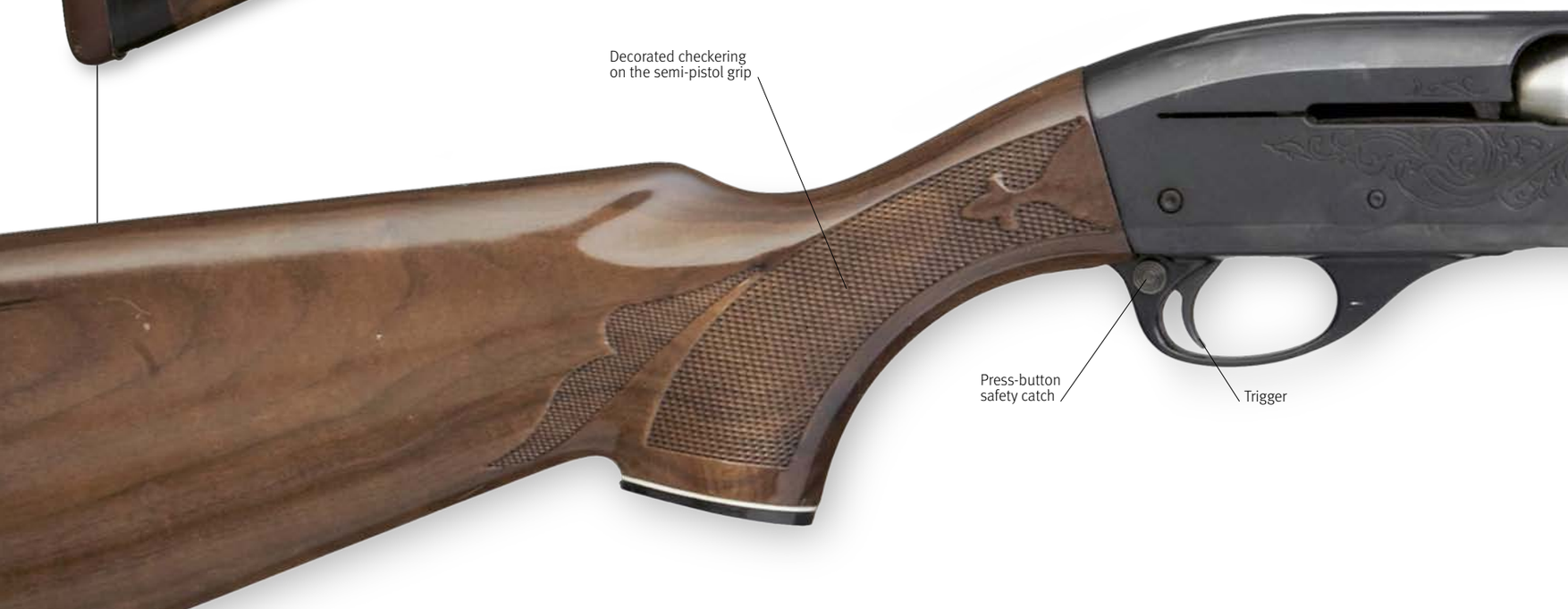
A young gunmaker named John Browning began working for Winchester in 1883. His first task was to revamp the action of the company's under-lever rifle to allow it to use new types of ammunition, and he supplemented Tyler Henry's toggle-jointed bolt with additional vertical locking bars. The system was perfected in the Model 1894.

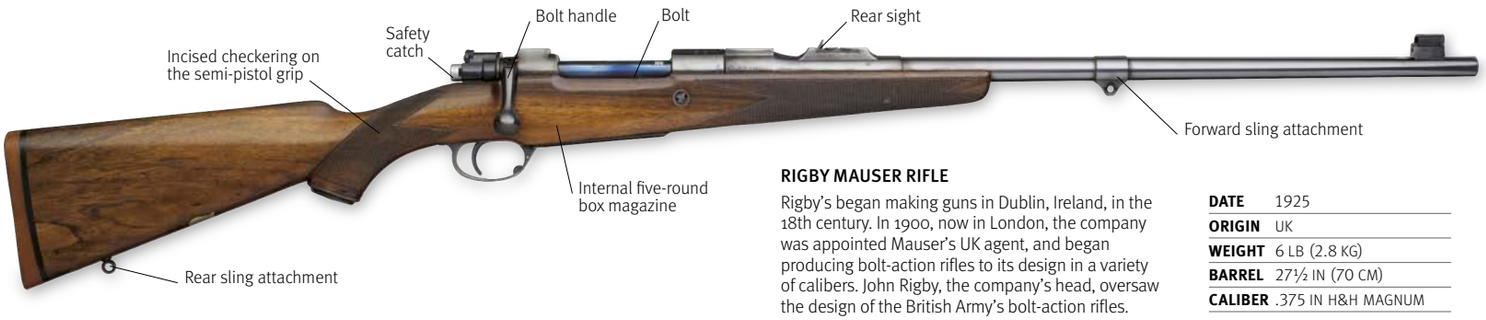
DATE	1894
ORIGIN	US
WEIGHT	7 LB (3.18 KG)
BARREL	20 IN (50.8 CM)
CALIBER	.30-30

WESTLEY RICHARDS HAMMERLESS EJECTOR GUN

Master gunmakers Westley Richards produced various notable and highly innovative sporting guns and rifles. This example of a double-barreled hammerless ejector gun has a patent one-striker mechanism and locks that can be detached by hand. A press-button mechanism enables each barrel to be fired independently. Available in a choice of finishes, the gun could be tailored to suit the individual tastes of purchasers.

DATE	c.1930
ORIGIN	UK
WEIGHT	6 LB (2.76 KG)
LENGTH	26 IN (67.5 CM)
CALIBER	12-BORE

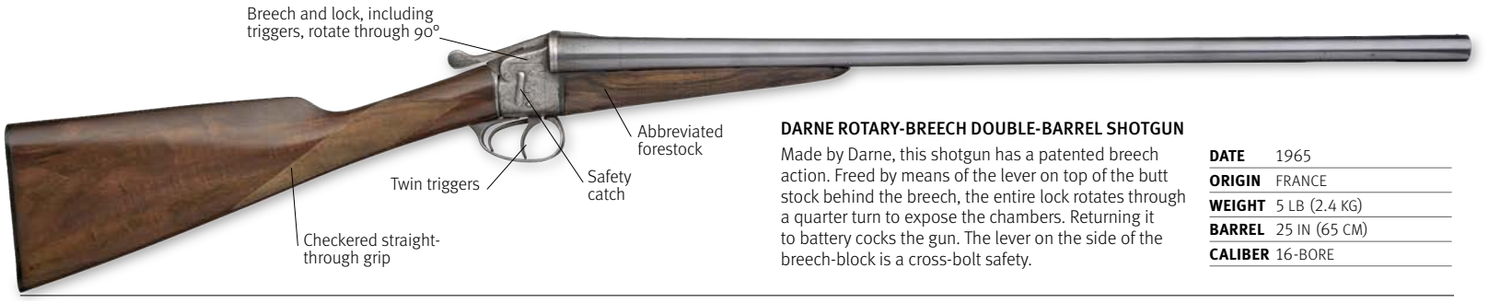




RIGBY MAUSER RIFLE

Rigby's began making guns in Dublin, Ireland, in the 18th century. In 1900, now in London, the company was appointed Mauser's UK agent, and began producing bolt-action rifles to its design in a variety of calibers. John Rigby, the company's head, oversaw the design of the British Army's bolt-action rifles.

DATE	1925
ORIGIN	UK
WEIGHT	6 LB (2.8 KG)
BARREL	27½ IN (70 CM)
CALIBER	.375 IN H&H MAGNUM



DARNE ROTARY-BREECH DOUBLE-BARREL SHOTGUN

Made by Darne, this shotgun has a patented breech action. Freed by means of the lever on top of the butt stock behind the breech, the entire lock rotates through a quarter turn to expose the chambers. Returning it to battery cocks the gun. The lever on the side of the breech-block is a cross-bolt safety.

DATE	1965
ORIGIN	FRANCE
WEIGHT	5 LB (2.4 KG)
BARREL	25 IN (65 CM)
CALIBER	16-BORE

BERETTA DOUBLE-BARREL SHOTGUN

Pietro Beretta is the longest-established gun maker in the world, having been in business since 1526. Its over-and-under double-barreled shotguns, like this Model S-686, have been the most popular configuration for both hunting and trapshooting. Over-and-under guns have the advantage of a single sight line. Most are fitted with single-trigger locks.

DATE	1982
ORIGIN	ITALY
WEIGHT	6 LB (3.08 KG)
BARREL	28 IN (71 CM)
CALIBER	12-BORE

FULL VIEW

REMINGTON 1100 AUTOMATIC SHOTGUN

John Browning produced the first design for a gas-operated, self-loading shotgun while working for Winchester, but it was not put into production. Modern automatics can be either gas- or recoil-operated. This Remington 1100 is gas-operated, and was produced in a variety of barrel lengths and calibers.

DATE	1985
ORIGIN	US
WEIGHT	8 LB (3.6 KG)
BARREL	28 IN (71 CM)
CALIBER	12-BORE

SHOTGUNS

THE SHOTGUN HAS ALWAYS BEEN an effective close-quarters weapon, and its value was recognized by infantrymen in World War I. As well as sport guns, usually with their barrels cut down, they used purpose-built guns like Winchester's six-shot pump-action Model 1897, which became known as the "trench sweeper." More recently, developments centered on increasing the capacity of the magazine and on new types of ammunition for both military and civilian security operations.

FRANCHI SPAS 12

Developed as a close-combat weapon for both police and military use, the SPAS (Special-Purpose Automatic Shotgun) is gas-operated by an annular piston around the under-barrel magazine tube, acting on a tilting bolt. It can be switched over to pump action when required. They were expensive to manufacture, but reliable.

DATE	1978
ORIGIN	ITALY
WEIGHT	9 LB (4.4 KG)
BARREL	21 IN (54.5 CM)
CALIBER	12-BORE

GREENER-MARTINI POLICE SHOTGUN

Developed after World War I for use by British colonial police forces, this gun was unconventional in that it had a Martini falling-block action. Furthermore, it accepted only cartridges of an unusual form, to prevent stolen guns from being used by civilians.

DATE	1920
ORIGIN	UK
WEIGHT	8 LB (3.68 KG)
BARREL	2 IN (6.3 CM)
CALIBER	14-BORE

WINCHESTER MODEL 1887

Another action unique in a shotgun is the lever-action rolling block of the Winchester Model 1887, designed by John Browning. Produced in 10-bore and 12-bore chamberings (and a very few to accommodate .70 in bulleted cartridges), the lever action proved unsuitable for shotgun cartridges, and was discontinued in favor of pump-action guns.

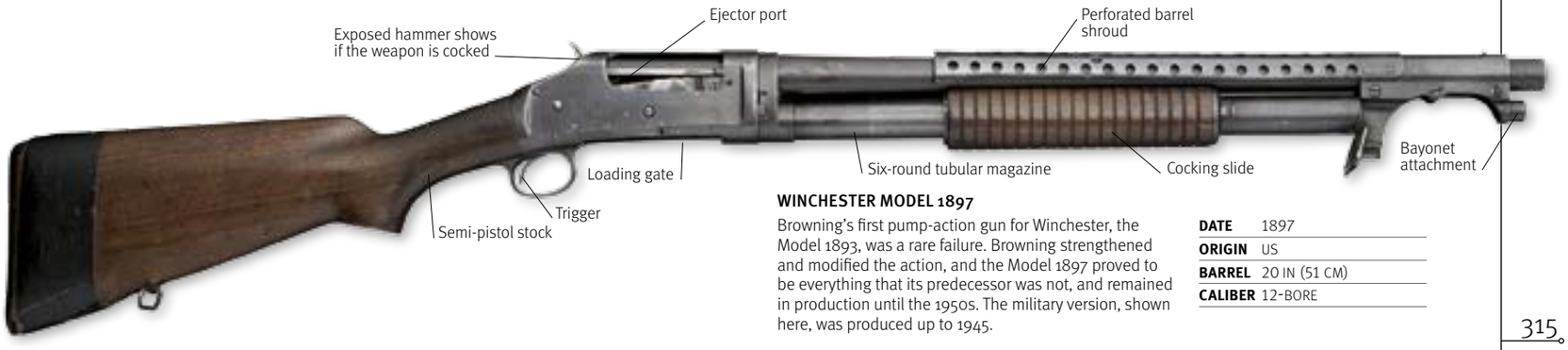
DATE	1887
ORIGIN	US
WEIGHT	8 LB (3.76 KG)
BARREL	19 IN (50 CM)
CALIBER	12-BORE

FULL VIEW

USAS-12

Designed in the United States, and manufactured in South Korea by Daewoo, the USAS-12 is unusual in two respects. Firstly, it is a selective-fire weapon, with the option for single-shot or automatic operation; secondly, it can be set up for either right- or left-handed operation.

DATE	1992
ORIGIN	US/SOUTH KOREA
WEIGHT	12 LB (5.5 KG)
BARREL	18 IN (46 CM)
CALIBER	12-BORE



WINCHESTER MODEL 1897

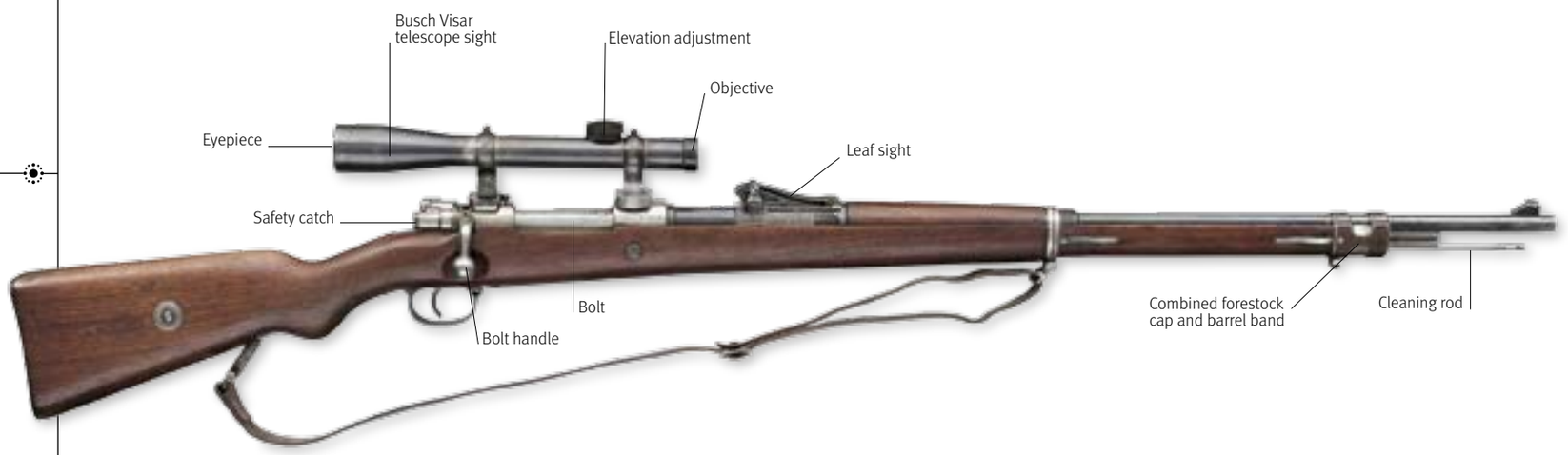
Browning's first pump-action gun for Winchester, the Model 1893, was a rare failure. Browning strengthened and modified the action, and the Model 1897 proved to be everything that its predecessor was not, and remained in production until the 1950s. The military version, shown here, was produced up to 1945.

DATE	1897
ORIGIN	US
BARREL	20 IN (51 CM)
CALIBER	12-BORE

VIETNAM WAR
Australian forces fought alongside the US army and Marine Corps in Vietnam. The men of this patrol, disembarking from a CH-47 Chinook helicopter, are armed with the self-loading FN FAL rifle, which was also issued to British troops at the time, and the American M60 general-purpose machine gun.

SNIPER RIFLES 1914–1985

BY THE TIME OF THE CIVIL WAR in the United States, weapons technology had progressed to the point where it was possible to shoot an identified individual at very long ranges. By World War I, the sniper had already become a very important figure on the battlefield, but it was only in World War II that he (and often, particularly in the Red Army, she) really made his or her mark. At that time, sniping was perhaps best described as a 'black art', but more recently, technological advances have turned it into more of a science.



MAUSER GEW 98

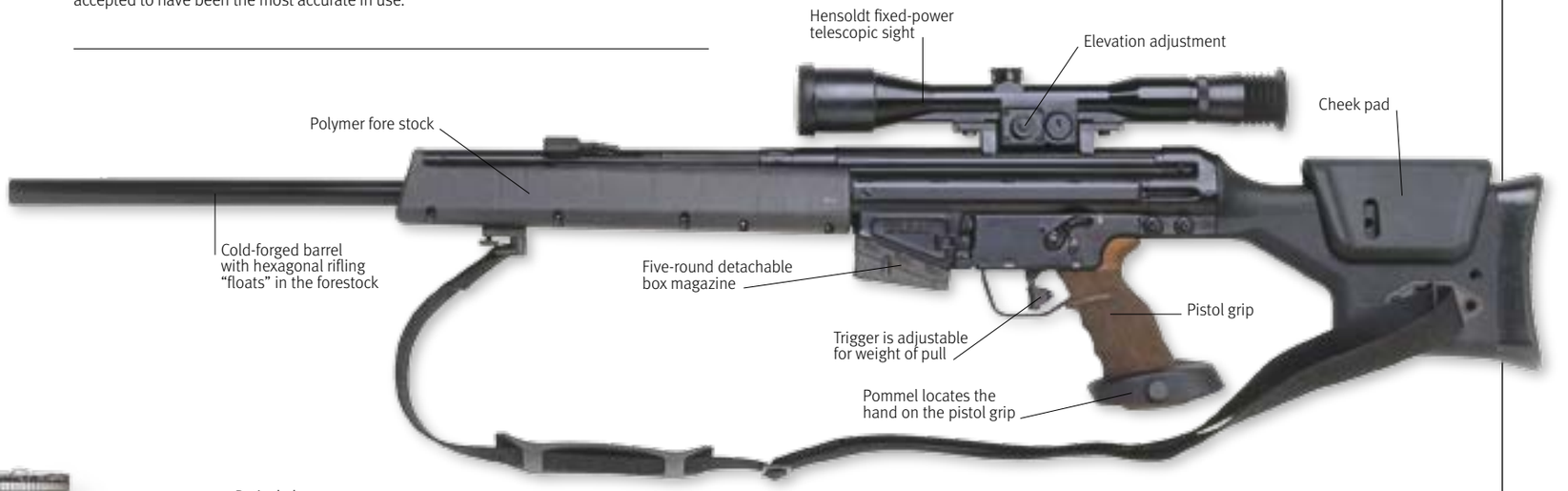
Specially selected examples of the Mauser Infanteriegewehr 98, the German Army's standard rifle of World War I, continued to be used as snipers' weapons throughout World War II. The rifles were fitted initially with a 2.75x telescopic sight produced commercially as the Visar by Emil Busch AG. The sight was graduated from 100 to 1,000 m, and matched to a particular rifle.

DATE	1900 ONWARD
ORIGIN	GERMANY
WEIGHT	9¼ LB (4.15 KG)
BARREL	21¼ IN (75 CM)
CALIBER	7.92 MM

MOSIN-NAGANT M1891/30PU

In the 1930s the Red Army began issuing specially selected Model 1891/30 Mosin-Nagant rifles, fitted with Type PE telescopic sights, to its most accomplished marksmen. The sight was replaced with the 3.5-power PU. Some 330,000 M1891/30PU sniper rifles were produced during World War II, and it was widely accepted to have been the most accurate in use.

DATE	1941
ORIGIN	USSR
WEIGHT	11¼ LB (5.15 KG)
BARREL	28¾ IN (73 CM)
CALIBER	7.62 MM x 54R



HECKLER & KOCH PSG-1

Intended as a police sniper rifle, the PSG-1 was essentially a heavily modified G3, as issued to the German Army, with the same roller-delayed blowback action. The most significant differences lie in the cold-forged, hexagonally rifled barrel and the Hensoldt 6x42 fixed-power sight, which has an illuminated reticle.

DATE	1985
ORIGIN	GERMANY
WEIGHT	17¼ LB (8.1 KG)
BARREL	25½ IN (65 CM)
CALIBER	7.62 MM x 51 NATO

DRAGUNOV SVD

The Snaiperskaya Vintovka Dragunova (chambered for the rimmed 7.62 mm round developed for the "3-line" Mosin-Nagant rifle in 1891) was adopted by the Soviet bloc armies in 1963. Its PSO-1 telescopic sight has a limited infrared capability.

DATE	1963 ONWARD
ORIGIN	USSR
WEIGHT	9½ LB (4.3 KG)
BARREL	24 IN (61 CM)
CALIBER	7.62 MM x 54R

SNIPER RIFLES 1985–2006

UNTIL THE 1990S, SNIPER RIFLES used conventional ammunition. Some new models then adopted more powerful ammunition that gave both a flatter trajectory and increased the "point-blank" range to several hundred feet. It also allowed them to reach out to greater distances. Others changed their nature more substantially, adopting the "bullpup" configuration that allowed their overall size to be much reduced, while retaining the all-important long barrel.

WALTHER WA2000

Developed for police use, most were produced in .300 Winchester Magnum caliber. The example shown here is the experimental Series 1 version: the operational Series 2 had an upgraded gas system and an unfluted barrel, which improved accuracy. Both types were fitted with variable-power Schmidt & Bender telescopic sights.

DATE	1978–88
ORIGIN	GERMANY
WEIGHT	15 LB (6.95 KG)
BARREL	25½ IN (65 CM)
CALIBER	7.62 MM NATO

FULL VIEW

L96A1

The British Army's L96A1 sniper rifle, in service since 1986, was the first to be developed specifically for sniping: earlier versions had been based on various models of the Lee-Enfield. It has an aluminum frame to which its components are attached. Each rifle is individually fitted with a Schmidt & Bender 6x telescopic sight.

DATE	1986 ONWARD
ORIGIN	UK
WEIGHT	14 LB (6.5 KG)
BARREL	25¾ IN (65.5 CM)
CALIBER	7.62 MM NATO

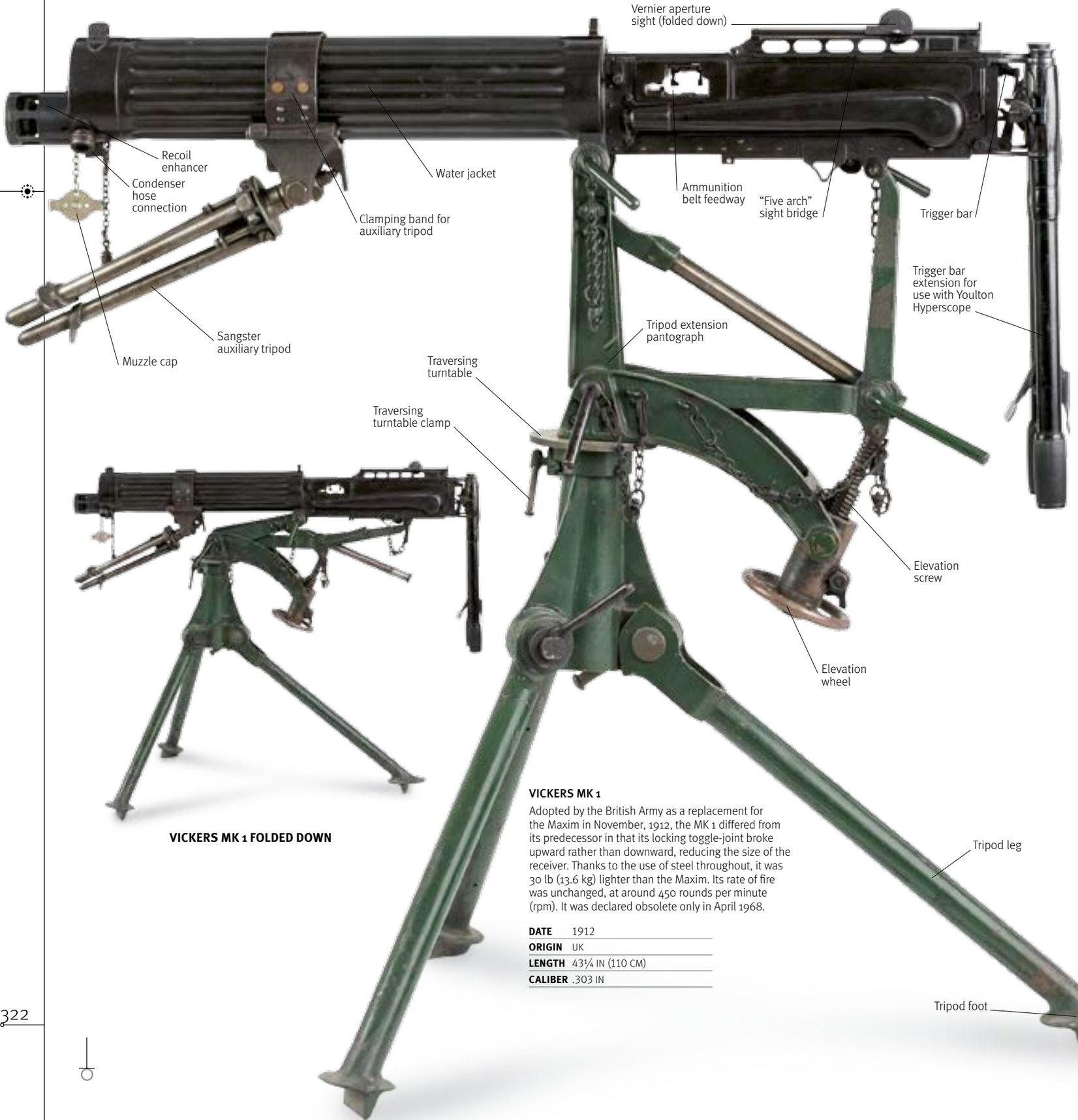
BARRETT MOD.90

In 1982, 20-year-old Ronnie Barrett designed a .50-caliber sniper rifle as a bet. The gas-operated Model 82 (adopted by the US Army as the M107) revolutionized the field, and was followed by the lighter, bolt-action, bullpup Model 90, and an upgraded version, the Model 95. The heavy .50-caliber round makes the rifle an effective anti-material weapon to a range of 5,900 ft (1,800 m).

DATE	1990–95
ORIGIN	US
WEIGHT	22LB (10 KG) LESS OPTICS
BARREL	29 IN (73.7 CM)
CALIBER	.50 IN

RECOIL-OPERATED MACHINE GUNS

UNTIL THE SECOND DECADE of the 20th century, Maxim's method of harnessing a gun's recoil was ubiquitous; the British Vickers, incorporating only minor modifications, was the only newcomer. Then John Moses Browning, who had previously gone to great lengths to disguise the fact that he had violated Maxim's patents in his Colt M1895, came up with a new way of harnessing the same force.



VICKERS MK 1 FOLDED DOWN

VICKERS MK 1

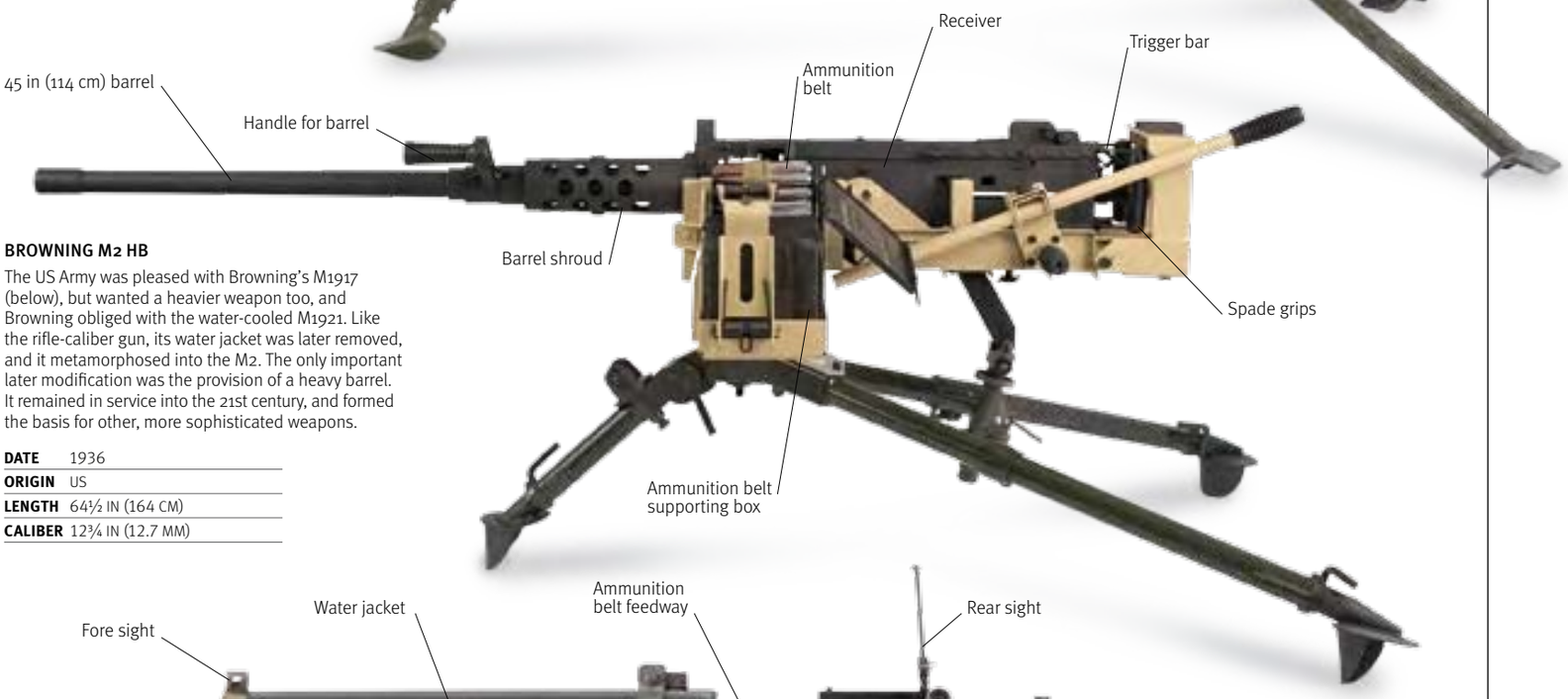
Adopted by the British Army as a replacement for the Maxim in November, 1912, the MK 1 differed from its predecessor in that its locking toggle-joint broke upward rather than downward, reducing the size of the receiver. Thanks to the use of steel throughout, it was 30 lb (13.6 kg) lighter than the Maxim. Its rate of fire was unchanged, at around 450 rounds per minute (rpm). It was declared obsolete only in April 1968.

DATE	1912
ORIGIN	UK
LENGTH	43¼ IN (110 CM)
CALIBER	.303 IN

MG42

Germany was prohibited from developing new weapons by the Treaty of Versailles, but it did so in secret, abroad. In 1934 the Maschinengewehr 34 was officially adopted as the MG08's replacement. At just 26.6 lb (12 kg), it was light, yet robust enough to deliver sustained fire at up to 900 rpm, but it was expensive to produce, and was superseded by the MG42, far and away the best automatic weapon of its day, capable of 1,200 rpm.

DATE	1943
ORIGIN	GERMANY
LENGTH	48 IN (122 CM)
CALIBER	7.92 MM MAUSER



BROWNING M2 HB

The US Army was pleased with Browning's M1917 (below), but wanted a heavier weapon too, and Browning obliged with the water-cooled M1921. Like the rifle-caliber gun, its water jacket was later removed, and it metamorphosed into the M2. The only important later modification was the provision of a heavy barrel. It remained in service into the 21st century, and formed the basis for other, more sophisticated weapons.

DATE	1936
ORIGIN	US
LENGTH	64½ IN (164 CM)
CALIBER	12¾ IN (12.7 MM)

BROWNING M1917

John Browning first produced a design for a machine gun in 1895, and when he had finished work on the M1911 pistol, he returned to the subject, and came up with a simpler method of locking breech-block and barrel than Maxim had used. His new gun was adopted by the US Army as the M1917. It soon lost its water jacket and became the air-cooled M1919, and remained in service in that form until the 1960s.

DATE	1912
ORIGIN	US
LENGTH	38½ IN (58 CM)
CALIBER	.30-06 IN

FULL VIEW

GAS-OPERATED MACHINE GUNS

WHEN MAXIM BUILT HIS FIRST machine gun, there was no question of using propellant gases to cycle the action because they carried too much particulate residue, but by the 1890s, the introduction of smokeless propellants had changed that. In 1893 an Austrian cavalryman, Odkolek von Augezd, sold a design for just such a gun to the Hotchkiss company in Paris. Since then, gas operation has become commonplace.

ZB 53 (VZ/37 OR BESA)

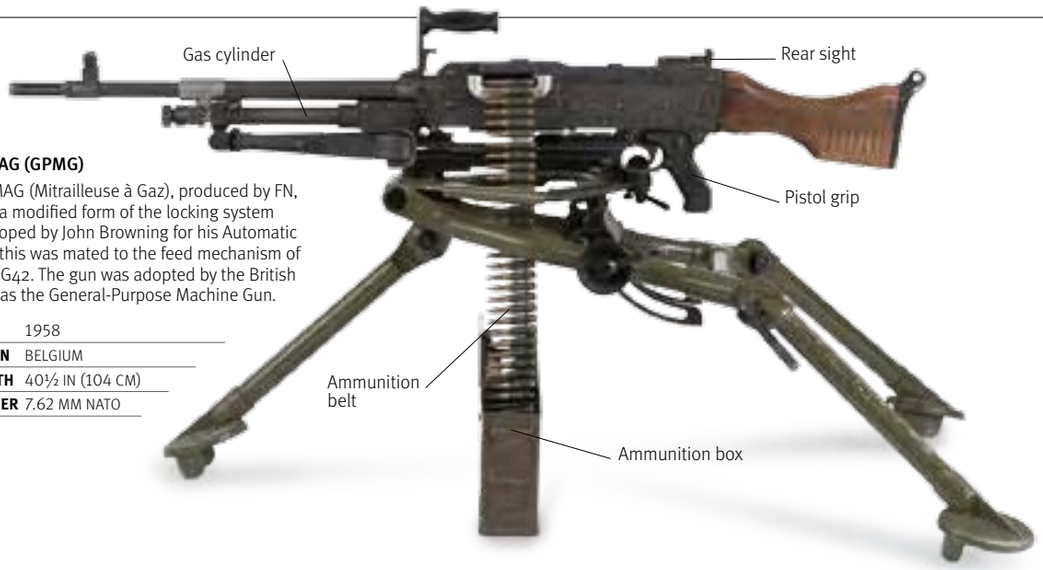
Machine gun designer Vaclav Holek was one of the stars of the 1930s. He used similar locking methods on both the Bren gun and the ZB 53. The latter was known as the VZ/37 by the Czechs and Besa by the British, who used it in their tanks.

DATE	1937
ORIGIN	CZECHOSLOVAKIA
BARREL	26¾ IN (67.8 CM)
CALIBER	7.92 MM MAUSER

GORYUNOV SGM

The Red Army used its Maxims well into World War II, but by 1942, it desperately needed a cheaper replacement. Goryunov mated elements of an earlier unsuccessful design with Holek's locking system. His original SG43 underwent modification, post-war, and became the SGM.

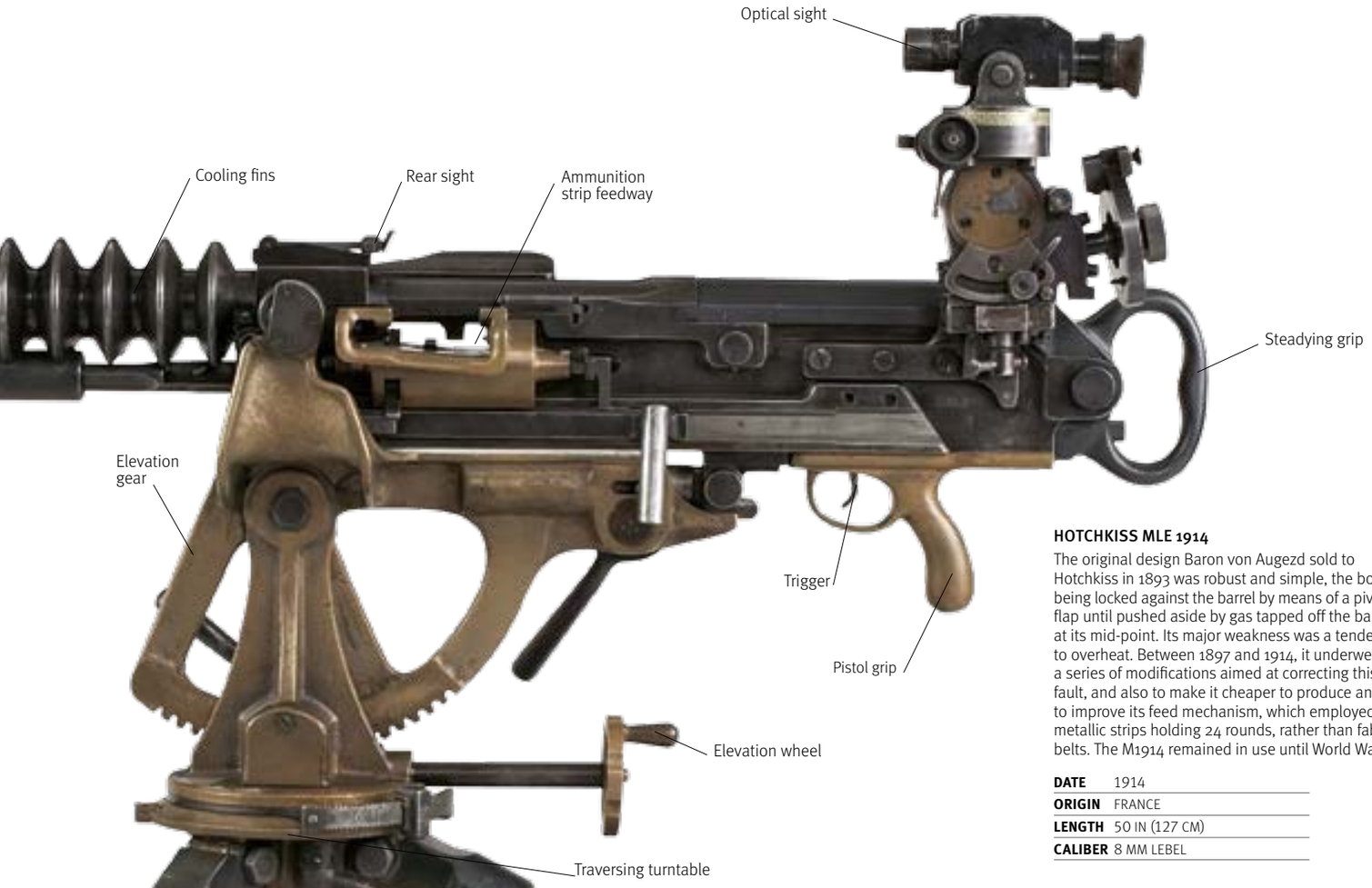
DATE	1943
ORIGIN	USSR
LENGTH	44 IN (112 CM)
CALIBER	7.62 MM x 54



FN MAG (GPMG)

The MAG (Mitrailleuse à Gaz), produced by FN, used a modified form of the locking system developed by John Browning for his Automatic Rifle; this was mated to the feed mechanism of the MG42. The gun was adopted by the British Army as the General-Purpose Machine Gun.

DATE	1958
ORIGIN	BELGIUM
LENGTH	40½ IN (104 CM)
CALIBER	7.62 MM NATO



HOTCHKISS MLE 1914

The original design Baron von Augezd sold to Hotchkiss in 1893 was robust and simple, the bolt being locked against the barrel by means of a pivoting flap until pushed aside by gas tapped off the barrel at its mid-point. Its major weakness was a tendency to overheat. Between 1897 and 1914, it underwent a series of modifications aimed at correcting this fault, and also to make it cheaper to produce and to improve its feed mechanism, which employed metallic strips holding 24 rounds, rather than fabric belts. The M1914 remained in use until World War II.

DATE	1914
ORIGIN	FRANCE
LENGTH	50 IN (127 CM)
CALIBER	8 MM LEBEL

M60

The US Army replaced its Browning M1917 derivatives with a new, gas-operated, general-purpose machine gun in the early 1960s. The M60 used the feed system of the MG42 and the locking system of the German FG42 assault rifle. It was unsatisfactory to begin with, but a series of modifications over two decades corrected most of its faults.

DATE	1963
ORIGIN	US
LENGTH	43½ IN (110 CM)
CALIBER	7.62 MM NATO

MG43 MACHINE GUN

HECKLER & KOCH'S ANSWER to FN's Minimi Squad Automatic Weapon, the MG43 is a conventional gas-operated light machine gun with an action based on a rotating, rather than the roller-locked, bolt employed in H&K's other contemporary weapons. It is simpler in design than the Minimi, being belt-fed only, and is consequently cheaper to manufacture. Like virtually all modern firearms, it makes use of molded glass-reinforced polymers wherever possible. It has an integral bipod, plus mounting points for the M2 tripod, as well as a Picatinny rail (named after a US Army Research and Devolopment establishment) on the receiver that will accept all NATO-standard optical sighting units as well as a basic aperture rear sight.

MG43

The MG43 is one of a new range of light support weapons chambered for the NATO-standard 5.56 mm round. It is light enough to be handled in the LMG role and rugged enough to function as a sustained-fire weapon at a cyclical rate of 750 rpm. The barrel can be changed in seconds, its handle folding to lie along the receiver just in front of the cocking handle. This example is a trial produced for the UK, not a standard model.

DATE	2001
ORIGIN	GERMANY
WEIGHT	18.85 LB (8.55 KG)
BARREL	19 IN (48 CM)
CALIBER	5.56 MM x 45 NATO

FULL VIEW


SUSAT sight with four-power magnification and low-light capability
Plastic butt stock hinged here to fold to left
F
S
Safety catch with provision for fully automatic fire only
Trigger
Molded plastic pistol grip

LIGHT MACHINE GUNS 1914–1945

THE FIRST GENERATION of machine guns were too cumbersome to be used in anything but fixed positions, so there was also a need for a lighter, portable weapon capable of putting down sustained fire. The barrels of early light machine guns tended to overheat. This problem was solved by the development of systems that enabled the barrels to be changed quickly and easily, even under combat conditions.

BROWNING AUTOMATIC RIFLE

John Browning set out to design a self-loading rifle, but it was soon obvious that the weapon he produced was better suited to the role of light support weapon. Though it had a fixed barrel and poor magazine capacity, it remained in front-line service with the US Army and Marine Corps until the mid-1950s.

DATE	1918
ORIGIN	US
WEIGHT	16 LB (7.3 KG)
BARREL	24 IN (61 CM)
CALIBER	.30-60

MG08/15

Germany's first, hurried attempt to produce a light machine gun saw the Maxim MG08 fitted with a butt stock, a pistol grip, and a conventional trigger. It also had an integral bipod, with a shortened ammunition belt contained in a drumlike container. It was far too heavy, but around 130,000 were produced, and it became the principle support weapon for the Reichswehr's stormtroopers.

DATE	1917
ORIGIN	GERMANY
WEIGHT	48½ LB (22 KG)
BARREL	28¼ IN (72 CM)
CALIBER	7.92 MM x 57

DEGTYAREV RP46

The Red Army adopted the Degtyarev DP in 1928. It was modified in 1945, and the following year, it received a heavier barrel and was adapted to take belts as well as drum magazines. The RP46 was still not entirely satisfactory, however, and was soon replaced by the RPD.

DATE	1946
ORIGIN	USSR
WEIGHT	28¾ LB (13 KG)
BARREL	23¾ IN (60.5 CM)
CALIBER	7.62 MM x 54R

BREN

Developed at Brno and modified at Enfield (hence its name) the Bren gun was the British Army's principle light support weapon from its introduction until the 1970s, latterly in 7.62 mm NATO chambering. If it had a deficiency, it lay in its (rimmed) ammunition, not in the gun itself.

DATE	1937
ORIGIN	CZECHOSLOVAKIA/UK
WEIGHT	22½ LB (10.15 KG)
BARREL	25 IN (63.5 CM)
CALIBER	.303 IN

FULL VIEW

LEWIS

The British Army adopted the air-cooled, gas-operated Lewis gun in 1915, and it remained its standard light support weapon until it was superseded by the Bren. The original design was the work of Samuel MacLean, but it was modified by Colonel Isaac Lewis of the US Army, who went on to market it aggressively. The US Army Air Corps adopted it as a flexibly mounted weapon.

DATE	1912
ORIGIN	US
WEIGHT	26 LB (11.8 KG)
BARREL	26¼ IN (66.5 CM)
CALIBER	.303 IN

LIGHT MACHINE GUNS SINCE 1945

DURING WORLD WAR II engagements took place at shorter ranges than previously. This had two consequences: the barrels of rifles and light machine guns became shorter, and the rounds they fired became lower-powered and lighter. For the individual soldier, this meant a welcome reduction in the load he had to carry. More recently, weapons became even lighter when plastic replaced wood and bullpup configurations were introduced.

NEGEV

Israel Military Industries' Negev is one of the breed of lightweight automatic weapons that has blurred the distinction between LMG and GPMG. Chambered for the SS109 NATO round in 5.56 mm caliber, it can deliver automatic fire at 700 or 900 rounds per minute (rpm).

DATE	1988
ORIGIN	ISRAEL
WEIGHT	15¾ LB (7.2 KG)
BARREL	18 IN (46 CM)
CALIBER	5.56 MM X 45 NATO

FULL VIEW

FN MINIMI

FN's gas-operated, air-cooled Minimi accepts the NATO STANAG magazine or disintegrating-link belts, without modification. It was adopted by the US Army as its M249 Squad Automatic Weapon, and by the British Army as the L108A1.

DATE	1975
ORIGIN	BELGIUM
WEIGHT	15 LB (6.83 KG)
BARREL	18½ IN (46.5 CM)
CALIBER	5.56 MM X 45 NATO

CETME AMELI

Similar to CETME's assault rifle, with its roller-locked delayed action, the Ameli has a cyclical rate of fire that is determined by the type of bolt fitted. A light bolt gives 1,200 rpm, while a heavy bolt gives 850 rpm. A lightweight version of this weapon was also developed.

DATE	1982
ORIGIN	SPAIN
WEIGHT	14 LB (6.35 KG)
BARREL	15¾ IN (40 CM)
CALIBER	5.56 MM x 45 NATO

RPK74

The RPK74 was developed from the successful AKM assault rifle, and many parts are interchangeable with those of other Kalashnikov weapons. It entered service in the early 1960s, and replaced the RPD as the standard light machine gun of the Soviet infantry. However, the gun's fixed barrel meant that the rate of fire had to be kept below 75 rpm to prevent overheating.

DATE	1976
ORIGIN	USSR
WEIGHT	11 LB (5 KG)
BARREL	23¾ IN (59 CM)
CALIBER	5.45 MM x 39

L86A1 LIGHT SUPPORT WEAPON

The introduction of the L85A1 Individual Weapon into British service meant that a new support weapon had to be developed with the same caliber ammunition. The result was the L86A1, which replaced the L484 Bren gun. It has a heavier and larger barrel than the L85A1, and a rear grip to aid sustained firing. There is no quick-change barrel, so the gun must be fired in short, controlled bursts to prevent overheating.

DATE	1986
ORIGIN	UK
WEIGHT	12 LB (5.4 KG)
BARREL	25½ IN (64.5 CM)
CALIBER	5.56 MM x 45 NATO

SUBMACHINE GUNS 1920–1945

EARLY ATTEMPTS TO PRODUCE a light, rapid-fire weapon centered on pistols, but it soon became obvious that these were difficult to control, and that something more akin to a carbine, but firing a reduced-power round suitable for a handgun, was more likely to be effective. It was not until World War II that it became clear that the butt stock was superfluous to a submachine gun (SMG) and could be eliminated without negative effects.

VILLAR PEROSA

The first SMG was manufactured in 1915 as a double gun, paired in a simple mounting and fitted with spade grips, a single trigger bar, and a bipod. Later, these were revamped as carbines, with butt stocks and conventional triggers.

DATE	1920s
ORIGIN	ITALY
WEIGHT	6 LB (3.06 KG)
BARREL	11 IN (28 CM)
CALIBER	9 MM GLISENTI

MP40

In 1938, the German Army adopted a new, handier design for a SMG, but it was still uneconomical to produce. Two years later, it was re-engineered to replace expensive machining with pressed and welded construction. This later design set the trend for an entire generation of SMGs.

DATE	1940
ORIGIN	GERMANY
WEIGHT	9 LB (4.03 KG)
BARREL	9 IN (24.8 CM)
CALIBER	9 MM PARABELLUM

THOMPSON M1921

US General John Tagliaferro Thompson began by designing an unsatisfactory self-loading rifle in 1916, but by 1919, he had produced an early version of what would be known universally as the Tommy Gun. The M1921 was the first to come to the market, but it was not until 1928 that the US Government adopted it, in small numbers, for the Marine Corps.

DATE	1921
ORIGIN	US
WEIGHT	10 LB (4.88 KG)
BARREL	10 IN (26.7 CM)
CALIBER	.45 ACP

PPSH41

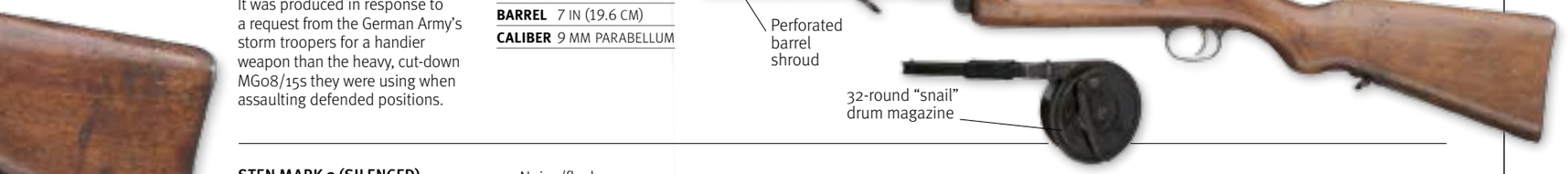
Shpagin's "Peh-Peh-Sheh," reliable and simple both to manufacture and to maintain, was to become the mainstay of the Red Army after it stopped the German advance into the Soviet Union. At least five million had been produced by 1945, and infantry tactics were modified to make the best use of them.

DATE 1944
ORIGIN USSR
WEIGHT 7 LB (3.5 KG)
BARREL 10 IN (27 CM)
CALIBER 7.62 MM SOVIET

BERGMANN MP18/I

The Hugo Schmeisser-designed MP18/I can lay claim to being the first effective submachine gun. It was produced in response to a request from the German Army's storm troopers for a handier weapon than the heavy, cut-down MG08/15s they were using when assaulting defended positions.

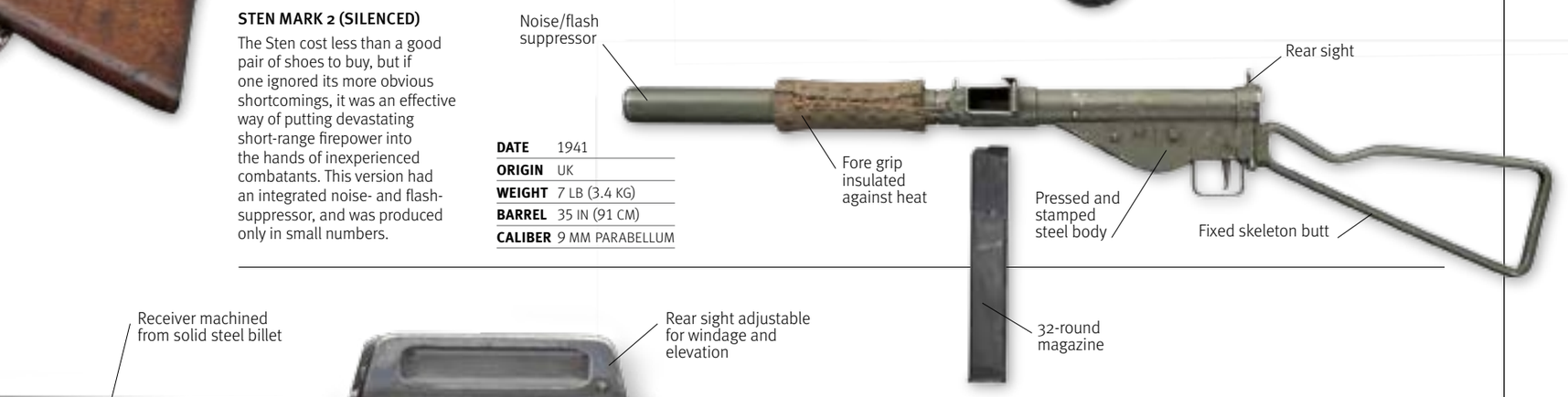
DATE 1918
ORIGIN GERMANY
WEIGHT 11 LB (5.25 KG)
BARREL 7 IN (19.6 CM)
CALIBER 9 MM PARABELLUM



STEN MARK 2 (SILENCED)

The Sten cost less than a good pair of shoes to buy, but if one ignored its more obvious shortcomings, it was an effective way of putting devastating short-range firepower into the hands of inexperienced combatants. This version had an integrated noise- and flash-suppressor, and was produced only in small numbers.

DATE 1941
ORIGIN UK
WEIGHT 7 LB (3.4 KG)
BARREL 35 IN (91 CM)
CALIBER 9 MM PARABELLUM



GANGLAND FAVORITE

If the Thompson was slow to find favor with the US Army, it received a warm welcome from the criminal fraternity defying Prohibition Laws in the US during the Roaring Twenties. It soon became a firm favorite.

MP5 SUBMACHINE-GUN

HECKLER & KOCH'S MP5 is the submachine-gun of choice for most of the Western world's police and special forces units. Mechanically it is very similar to the company's range of assault rifles, with a roller-locked delayed-blowback action. Firing from a closed bolt (most SMGs hold the bolt back when they are cocked) makes it considerably more accurate than others, and also improves controllability in the automatic mode, when it fires at a cyclical rate of 800 rpm. Laser target designators are often fitted, and a powerful torch can be mounted in place of the grenade launcher shown on this example.

AMMUNITION

The MP5 is chambered for the 9mm x 19 round Georg Luger developed for his eponymous pistol in 1908. Between 1996 and 2000 it was also offered in .40S&W and 10mm calibers.

Fore sight in annular shroud

Cocking handle

Attachment lugs for barrel-mounted accessories, including silencer

Grenade launcher trigger

Grenade launcher safety catch

ISTEC 40 x 46M grenade launcher

GRENADE

Fitted with an under-barrel grenade launcher, the MP5 can fire the complete range of 40mm grenades, including lethal, non-lethal, and illuminating rounds, over distances of several hundred meters.

FULL VIEW

MP5A5

The MP5 is also available with a rigid plastic stock. The trigger group (this example has safe/single/three-round/full-auto options) is also from the HK33, but it can be exchanged for one of a different configuration. A version with an integral silencer is also available, as is one with a short barrel.

DATE	1966
ORIGIN	GERMANY
WEIGHT	6¼LB (2.82KG)
BARREL	8¾IN (22.5CM)
CALIBRE	9MM PARABELLUM

Rear sight

Mounting for standard NATO sights

Recess for telescoping butt

Butt locking pin

Magazine release catch

Safety catch and rate-of-fire selector

15-round magazine can be exchanged for one holding 30 rounds

Rate-of-fire icons: single-shot, three-round burst (above), and automatic (top)

Moulded plastic pistol grip

SUBMACHINE GUNS SINCE 1945

THE SECOND GENERATION of submachine guns, introduced during and just after World War II, were unsophisticated weapons, designed for mass-production. They produced devastating short-range firepower and a great deal of noise, but were notoriously inaccurate and difficult to control, and were of limited military value as a result. More recently, developments have concentrated on applications for security and police.

UZI

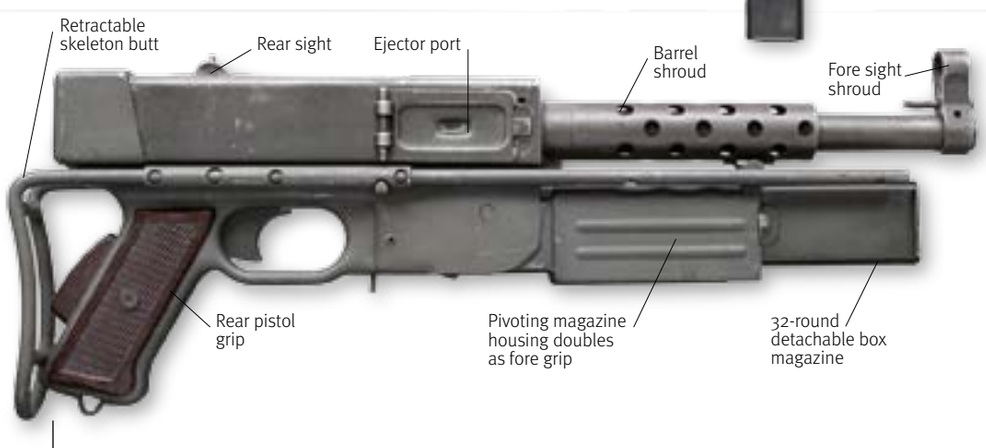
The secret of the Uzi's legendary stability lies in its bolt being wrapped around its barrel; this brings the center of gravity forward, and helps to cure the tendency for the barrel to rise during automatic fire. Heavy moving parts keep its rate of fire to a manageable level.

DATE	1950s
ORIGIN	ISRAEL
WEIGHT	8 LB (3.6 KG)
BARREL	10 IN (260 MM)
CALIBER	9 MM PARABELLUM

M3/M3A1 ("GREASE GUN")

The Grease Gun was cheap to produce and simple to strip, clean, and maintain. It fired the same heavy round as the Colt automatic pistol.

DATE	1940s
ORIGIN	US
WEIGHT	8.05 LB (3.66 KG)
BARREL	8 IN (203 MM)
CALIBER	.45 IN ACP



MAT 49

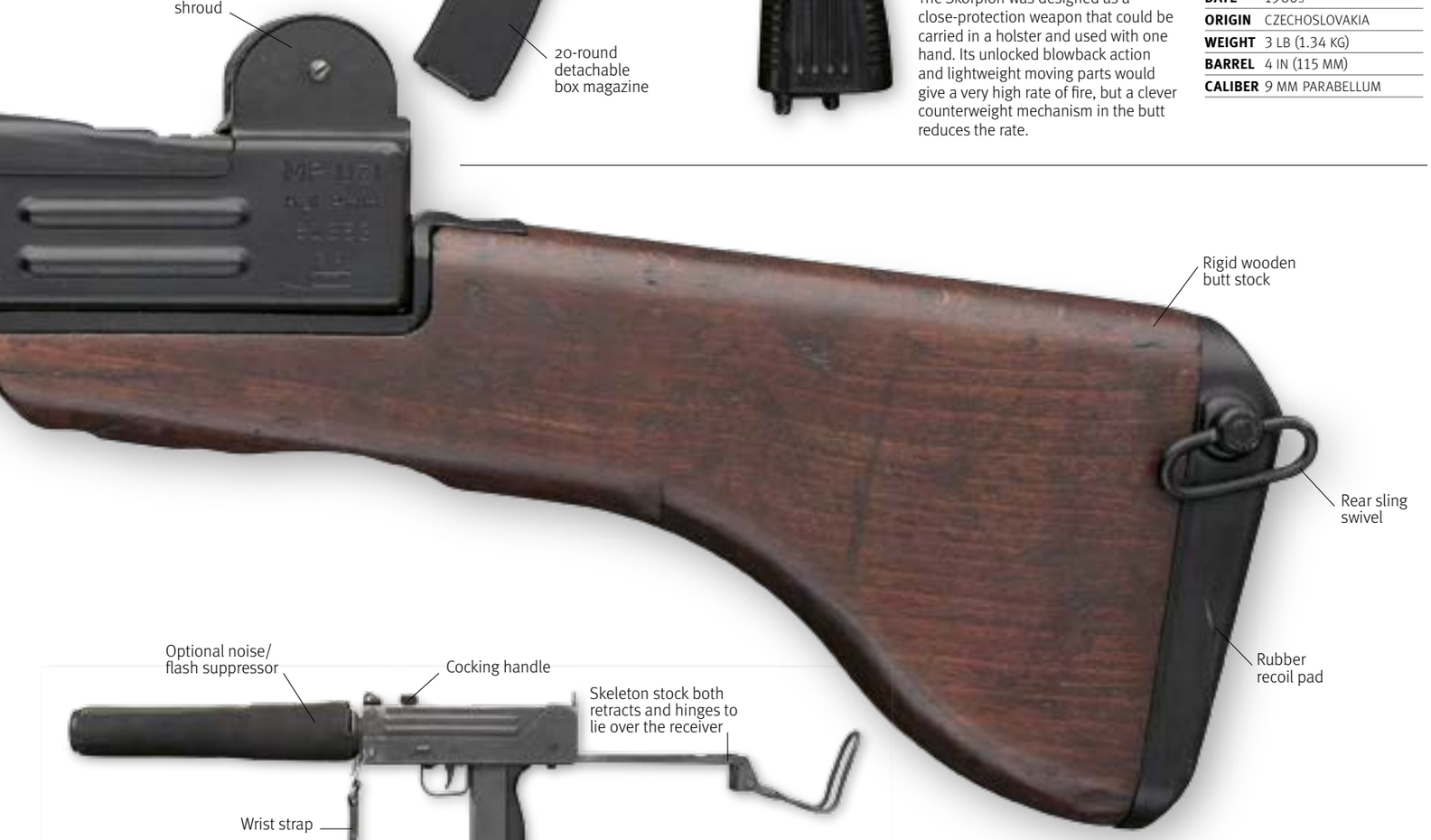
The MAT 49's distinctive feature is its pivoting magazine housing; as well as making the weapon easier to conceal, it's a very positive safety device.

DATE	1950s
ORIGIN	FRANCE
WEIGHT	7 LB (3.53 KG)
BARREL	9 IN (288 MM)
CALIBER	9 MM

VZ/68 SKORPION MOD 83

The Skorpion was designed as a close-protection weapon that could be carried in a holster and used with one hand. Its unlocked blowback action and lightweight moving parts would give a very high rate of fire, but a clever counterweight mechanism in the butt reduces the rate.

DATE	1960s
ORIGIN	CZECHOSLOVAKIA
WEIGHT	3 LB (1.34 KG)
BARREL	4 IN (115 MM)
CALIBER	9 MM PARABELLUM



INGRAM MAC-10

A telescoping bolt and a magazine incorporated into the pistol grip allowed Ingram to reduce the overall size of the MAC-10 to little more than that of an automatic pistol. With a cyclical rate of fire of well over a thousand rounds per minute, it can empty its 32-round magazine in little more than a second.

DATE	1970s
ORIGIN	US
WEIGHT	7 LB (3.4 KG)
BARREL	5 IN (146 MM)
CALIBER	9 MM PARABELLUM

FN P90

The first attempt to produce an entirely new compact automatic weapon, the P90 uses a "miniature" caliber round designed with damage limitation in mind. All its non-mechanical components are molded from plastic, and its unique horizontal ammunition feed mechanism allows the magazine to be incorporated into the receiver.

DATE	1990s
ORIGIN	BELGIUM
WEIGHT	6 LB (2.7 KG)
BARREL	11 IN (300 MM)
CALIBER	5.7 MM

AMMUNITION SINCE 1900

FOLLOWING THE DEVELOPMENT of the unitary brass cartridge, which combined all three essential elements (primer, propellant, and projectile) in one package, it only remained for the nature of those elements to be improved. Primers became more effective and bullets more aerodynamic, but the most important developments were in propellant. These took place in the last decade of the 19th century, first with the advent of smokeless powder and later of a nitroglycerine-based mixture generally known as cordite; this replaced gunpowder entirely.

.30-06 SPRINGFIELD
The .30-06 remained in US service from 1906 until 1954. Its 152-grain (9.85-g) bullet leaves the muzzle at 2,910 fps with 2,820 ft-lb of energy.

7.92 MM X 57 MAUSER
The SmK cartridge, as it was known, was loaded with a steel-jacketed 177-grain (11.5-g) boat-tailed bullet that left the muzzle at 2,745 fps.

Rifle cartridges

Rifle bullets acquired a sharply pointed nose and a taper toward the tail, which almost doubled their effective range and improved their accuracy. In these examples, both velocity (feet per second) and energy (foot-pounds) are measured at the muzzle.

.5/12.7 MM M2
Developed for the M2 machine gun and adopted as a rifle round, the M2 has a 710-grain (46-g) bullet and a muzzle velocity of 2,800 fps.

.470 NITRO EXPRESS
"Nitro" refers to the propellant, while "Express" refers to the bullet, which is hollow at the tip. Muzzle velocity is 2,150 fps, with 5,130 ft-lb of energy.

7.62 MM X 54R RUSSIAN
The "3-line" cartridge developed in 1891 was loaded with a 150-grain (9.65-g) bullet that left the muzzle at 2,855 fps.

.458 WINCHESTER MAGNUM
Developed in 1956 as a "big game" round, with a 500-grain (32.4-g) bullet, it give a muzzle velocity of 2,040 fps and 4,620 ft-lb of energy.

7.7 MM X 56R JAPANESE
The fully rimmed version of the round for which the Arisaka rifle was chambered had a 175-grain (11.35g) bullet and a muzzle velocity of 2,350 fps.

.416 REMINGTON MAGNUM
A development of a cartridge produced by Rigby in 1911, the .416 Remington produces a muzzle velocity of 2,400 fps and 5,115 ft-lb of energy.

7.7 MM X 56R ITALIAN
Almost identical to the above, the Italian 7.7 mm cartridge had a 173-grain (11.25-g) bullet and a smaller charge that produced 2,035 fps.

8 MM X 58 KRAG
This is an alternative chambering for the Norwegian Krag rifle, which the Danish Army adopted. A 195-grain (12.7-g) bullet left the muzzle at 2,525 fps.

.303 MKVII
This version of the Lee-Enfield cartridge, with a 180-grain (11.66-g) bullet, developed a muzzle velocity of 2,460 fps and 2,420 ft-lb of energy.

.338 WINCHESTER MAGNUM
Developed for large North American game, this cartridge can be loaded with a variety of projectiles from 175 to 300 grains (11.34g to 19.44 g) in weight.

7 MM REMINGTON MAGNUM
Loaded with 62 grains (4,02g) of propellant and a 150-grain (9.72-g) "spitzer" bullet, this produces a muzzle velocity of 3,100 fps and 3,220 ft-lb of energy.

.257 WEATHERBY MAGNUM
A "hot" round, loaded with an 87-grain (5.31-g) "varmint" bullet, this achieves a muzzle velocity of 3,825 fps and delivers 2,826 ft-lb of energy.

.243 WINCHESTER MAGNUM
This short-case round delivers less power than a normal cartridge: a 100-grain (6.48-g) bullet leaves the muzzle at 2,960 fps with 1,945 ft-lb of energy.

.22 HORNET
One of very few high-velocity miniature rounds, the .22 Hornet was developed in the 1920s. Its 45-grain (2.9-g) bullet leaves the muzzle at 2,690 fps.

.30 M1 CARBINE
This "intermediate" round developed for the US World War II-vintage M1 Carbine is loaded with a 110-grain (7.13-g) blunt-nosed bullet, good to 600 ft (180 m).

7.92 MM X 33 KURTZ
The first effective intermediate round, it was copied by the Soviet Union in slightly smaller dimensions. It was effective to around 1,950 ft (595 m).

SS109 5.56 MM
The NATO-standard SS109 5.56 mm round has a steel-tipped projectile weighing 61.7 grains (4 g) and achieves a muzzle velocity of 3,085 fps.

7.62 MM X 51 NATO
When NATO chose a new rifle and machine gun cartridge in the early 1950s it opted for one based on the .30-06.

5.45 MM X 40 SOVIET
This replaced the Red Army's 7.62 mm x 33 round for the AK74 family. It is similar to the 5.56 mm NATO round in performance.

4.73 MM G11
The wheel turns full circle with the advent of the caseless round developed for Heckler & Koch's G11 assault rifle.

Pistol cartridges

The only significant change in the character of pistol ammunition after 1900 was the introduction of the high-performance Magnum load.

.45 MARS
This was the most powerful pistol ammunition in the world prior to the arrival of the .44 Magnum.

9 MM MARS
Severely bottlenecked cartridges are unusual in pistols, but the designer insisted on a heavy propellant load for the 9 mm Mars.

9 MM STEYR
There are many varieties of 9 mm revolver cartridge; this one was developed for a pistol designed by Mannlicher.

9 MM PARABELLUM
Also known as 9 mm Luger, this is the most common cartridge in the world. Countless fireams have been chambered for it.

.45 ACP
Another iconic pistol cartridge, the .45 Automatic Colt Pistol round was developed for the John Browning-designed M1911.

.32 LONG
Though a popular caliber for revolvers, the original .32 cartridge was low on power. A longer version was produced in 1896.

.38 S&W
This is the least powerful .38 cartridge; it gives the 145-grain (9.4-g) bullet a muzzle velocity of 685 fps and 150 ft-lb of energy.

.380 ENFIELD/WEBLEY
Made for the Enfield Mk 1 revolver, this 200-grain (12.96-g) bullet was almost as powerful as the .455 it replaced.

.32 AUTO
A popular caliber for small self-loading pistols, the .32 has a 60-grain (3.89-g) bullet and produces 125 ft-lb of energy.

8 MM NAMBU
The Japanese officer's pistols issued from 1909 onward were the only weapons ever made for this powerful round.

.357 MAGNUM
Developed in 1935, this has since been produced in many varieties. Average muzzle velocity is around 1,300 fps.

.44 MAGNUM
This round was developed in 1954. A 240-grain (15.55-g) bullet leaves the muzzle at 1,500 fps with 1,200 ft-lb of energy.

.5 ACTION EXPRESS
Developed for the Desert Eagle pistol, this 325-grain (21-g) bullet leaves the muzzle with 1,415 ft-lb of energy.

MAN-PORTABLE ANTI-TANK WEAPONS

DURING WORLD WAR I, the only weapon capable of engaging a tank was a field artillery piece. Over the next two decades, dedicated anti-tank guns came into service, but there was a need for a lighter weapon that an infantryman could use, and anti-tank rifles were developed to meet it. These were of questionable effectiveness, and were soon abandoned, to be replaced by launchers for rocket-propelled bombs. The latter used a new technology, the shaped charge, which burned through armor like a blowtorch.

BOYS ANTI-TANK RIFLE

Birmingham Small Arms produced the Boys rifles in the mid-1930s. They were bolt-action weapons firing a heavy tungsten-steel round. Even though the barrel recoiled into the stock, the effect on the firer was fearsome. It was abandoned as ineffective in 1941 and replaced by the PIAT.

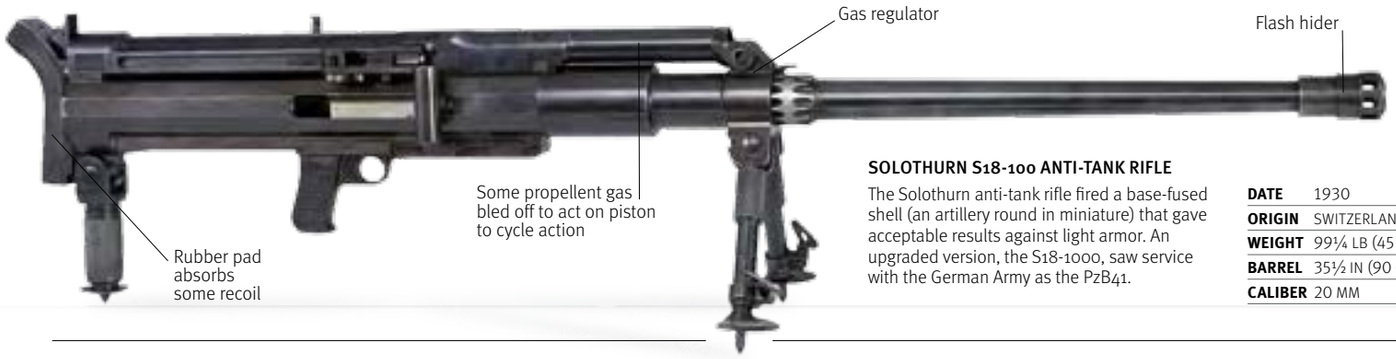
DATE	1936
ORIGIN	UK
WEIGHT	36 LB (16.3 KG)
BARREL	36 IN (91.5 CM)
CALIBER	.55 IN

PIAT 1.36 KG (3LB) BOMB

PROJECTOR, INFANTRY, ANTI-TANK

The PIAT, like the Sten, was a wartime expedient design that put function before form. It was actually a spigot mortar, firing a bomb with a shape-charged warhead. The spigot's spring was very powerful and ignited the bomb's propellant charge after it had hurled it from the weapon.

DATE	1942
ORIGIN	UK
WEIGHT	32 LB (14.5 KG)
LENGTH	36 IN (91.4 CM)
PROJECTILE	3 LB (1.36 KG)



SOLOTHURN S18-100 ANTI-TANK RIFLE

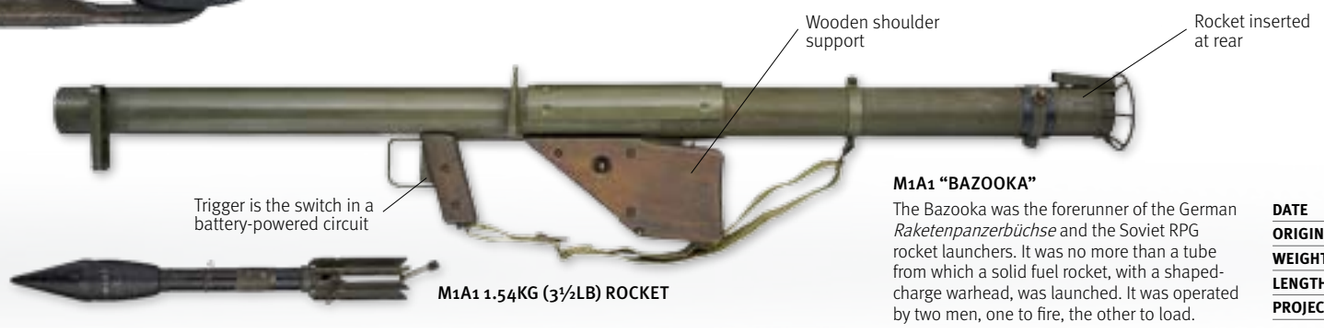
The Solothurn anti-tank rifle fired a base-fused shell (an artillery round in miniature) that gave acceptable results against light armor. An upgraded version, the S18-1000, saw service with the German Army as the PzB41.

DATE	1930
ORIGIN	SWITZERLAND
WEIGHT	99¼ LB (45 KG)
BARREL	35½ IN (90 CM)
CALIBER	20 MM

PTRD ANTI-TANK RIFLE

The PTRD was a more complicated weapon than it appeared. It had a barrel that recoiled into the stock and unlocked the bolt in the process; this was held back when the barrel returned to battery, opening the breech and ejecting the spent round. A fresh round was then introduced and the bolt closed by hand.

DATE	1941
ORIGIN	USSR
WEIGHT	38¼ LB (17.3 KG)
BARREL	48¼ IN (122.7 CM)
CALIBER	14.5 MM



M1A1 1.54KG (3½LB) ROCKET

M1A1 "BAZOOKA"

The Bazooka was the forerunner of the German *Raketenpanzerbüchse* and the Soviet RPG rocket launchers. It was no more than a tube from which a solid fuel rocket, with a shaped-charge warhead, was launched. It was operated by two men, one to fire, the other to load.

DATE	1942
ORIGIN	US
WEIGHT	13¼ LB (6 KG)
LENGTH	54 IN (137 CM)
PROJECTILE	3½ LB (1.54 KG)

RIFLE-MOUNTED GRENADE LAUNCHERS

UNTIL THE DEVELOPMENT OF the percussion cap, which could also be used to detonate explosive devices, grenades had slow-match fuses, and were so unreliable that they went out of use during the 19th century. By 1915, however, William Mills had invented a safe, reliable, primer-detonated grenade, which the British Army adopted as the No. 36. Soon after, a device that allowed it to be launched from a standard infantry rifle was introduced.

SMLE WITH MILLS BOMB LAUNCHER

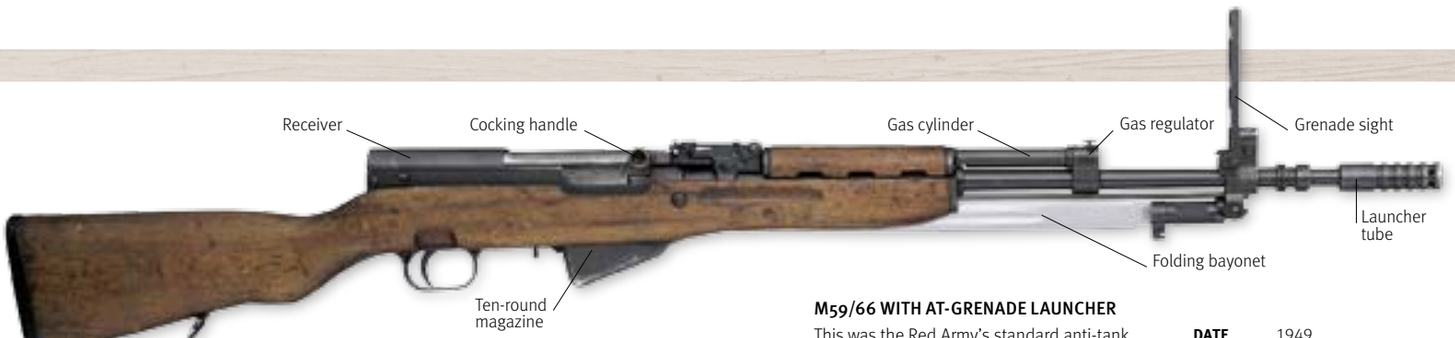
The Mills bomb was adapted for rifle-use by the addition of a rod to the base cap. The rifle itself was fitted with a ring or cup, mounted at the bayonet lug, to retain the grenade's arming lever. To fire the grenade, a specially formulated blank cartridge was used.

DATE	1915
ORIGIN	UK
GRENADE	ANTI-PERSONNEL
CALIBER	.303 IN
RANGE	490 FT (150 M)

NO. 4 RIFLE WITH AT-GRENADE LAUNCHER

With the introduction of the No. 4 Rifle, with its exposed muzzle, the British Army was able to develop a new style of tubular launcher. Mounted over the muzzle on the bayonet lugs, the No. 4 launched a fin-stabilized anti-tank grenade. Using an overpowered blank cartridge, it was fired with the butt of the rifle grounded. This example is fitted with a later model L1A1 practice grenade.

DATE	1940s
ORIGIN	UK
GRENADE	ANTI-TANK
CALIBER	.303 IN
RANGE	330 FT (100 M)



M59/66 WITH AT-GRENADE LAUNCHER

This was the Red Army's standard anti-tank grenade launcher during the 1950s. Mounted on the self-loading M59/66 assault rifle, it employed an overpowered blank cartridge. While effective, it proved unpopular due to the disastrous effect of mistakenly chambering a regular live round.

DATE	1949
ORIGIN	USSR
GRENADE	ANTI-TANK
CALIBER	7.62 MM x 39
RANGE	330 FT (100 M)

SIMONOV GRENADE

AK74 WITH GP25

The barrel-mounted grenade launcher was slow to use. The answer was to fit the grenade with its own propellant charge. The Red Army adopted one with the charge in the body of the grenade. Nothing remained in the launcher's barrel after it had been discharged. This AK74 lacks the recoil pad that is normally fitted to grenade launcher rifles.

DATE	1978
ORIGIN	USSR
GRENADE	ANTI-PERSONNEL
CALIBER	40 MM
RANGE	490 FT (150 M)

GP25 GRENADE

M16A1 WITH M203

The US Army's version of the assault rifle-mounted grenade launcher, the M203, employs a grenade mated to a cartridge case containing the propellant charge. The empty case remains in the chamber after the round has been fired and needs to be ejected. The M203 was developed to replace the stand-alone M79 grenade launcher.

DATE	1972
ORIGIN	US
GRENADE	ANTI-PERSONNEL
CALIBER	40 MM
RANGE	490 FT (150 M)

STAND-ALONE GRENADE LAUNCHERS

THERE ARE TIMES WHEN a rifle-mounted launcher is not what is required; for example, non-lethal 40 mm grenades are available for riot control purposes, when rifles would not normally be issued. On the battlefield, rapid-fire launchers have come to supersede light mortars, since not only can they be used in the direct- and indirect-fire role (i.e. against visible and invisible targets, the latter on a compass bearing) they can also put down a greater weight of bombs.

AGS-17 "PLAMYA"

The Soviet equivalent of the American 40 mm M19 that was first used in the Vietnam war. It is a belt-fed, blowback-operated launcher with a maximum range of 1 mile (1.61 km). Such weapons are commonly mounted in ground vehicles, boats, and hovercraft, and aboard helicopters and fixed-wing aircraft.

DATE	1975
ORIGIN	USSR
WEIGHT	48¼ LB (22 KG)
BARREL	11¾ IN (30 CM)
CALIBER	30 MM

M79 "BLOOPER"

Developed as a stand-alone grenade launcher during the 1950s, the M79 became known as the Blooper to the troops issued with it. It is a simple break-open design, a bit like a giant shotgun. Opening the breech ejects the spent casing, a fresh round is loaded, and closing the breech cocks the action.

DATE	1960
ORIGIN	US
WEIGHT	6 LB (2.75 KG)
BARREL	12 IN (30.5 CM)
CALIBER	40 MM

M79 40MM GRENADE

FULL VIEW

MECHEM/MILKOR MGL MK 1

A scaled-up version of a shotgun of similar design, the MGL MK 1 is a six-shot revolver grenade launcher. Indexing is performed by a spring, wound by rotating the cylinder manually when it is swung out of the frame for loading. Its maximum range is around 1,150 ft (350 m).

DATE	1990
ORIGIN	SOUTH AFRICA
WEIGHT	12 LB (5.6 KG)
BARREL	12 IN (30.5 CM)
CALIBER	40 MM

RPG-7V

The shoulder-launched RPG-7 is a much-improved version of the RPG-2. Its projectiles have a two-stage launcher/sustainer propellant charge, and a range of up to 500 m (1640 ft). A wide variety of grenades is available, including anti-personnel, fuel-air explosive, and high-explosive anti-tank projectiles.

DATE	1962
ORIGIN	USSR
WEIGHT	14 LB (6.3 KG)
BARREL	37¼ IN (95 CM)
CALIBER	40 MM

US NAVY SEAL

M16 RIFLE WITH GRENADE LAUNCHER

ESTABLISHED IN 1962, the US Navy SEAL (Sea-Air-Land) teams have built a reputation as the most impressive of American special operations forces. SEAL training is widely considered the most rigorous of any military force. It includes a strong emphasis on physical and mental fitness, including a week where students have less than four hours' sleep. Skills in which SEALs need to become proficient range from scuba diving and parachuting to close-quarters combat and demolition.

SPECIAL FORCES

The SEALs were created as part of President John F. Kennedy's drive to prepare US armed forces to meet the threat of guerrilla warfare. They were first sent into combat against communist forces in Vietnam in 1966, specializing in riverine operations. Since 1987 the SEALs have been grouped with all other American special forces under US Special Operations Command.

Deployed in landlocked Afghanistan after the American intervention in 2001, the SEALs fought in a role effectively indistinguishable from other special forces. Although the invasion of Iraq in 2003 gave SEALs a chance to exploit their waterborne role, for example capturing offshore oil terminals, once again their "Air-Land" element was much more prominent. SEALs led the way in the fast-moving campaign that destroyed the Iraqi army. US conventional forces were regularly called in to support them, rather than the other way around.

In 2006 the US Defense Department announced future war plans that envisaged a starring role for special forces in meeting the threat of global terrorist networks, described as "new and elusive foes." The Pentagon envisaged in particular that terrorists would be "found, fixed, and finished" by special forces calling in air strikes. If these plans are implemented, the future of the SEALs seems assured.

MULTI-TASKING
The many tasks potentially assigned to the 2,450 SEALs include recovering downed pilots, locating and freeing hostages, sabotage, reconnaissance, counterterrorism, and counter-drug operations. Such wide-ranging tasks require a wide variety of clothing, weapons, and equipment.

ARMED RIVER PATROL
Special Boat Units (SBUs) are, like the SEALs, a part of Special Naval Warfare Command. They are trained to carry out special operations in small surface craft, including river or sea patrols, and clandestine waterborne infiltration of commandos. SEAL seaborne or riverine operations are supported by teams of Special Warfare Combat-Craft Crewmen (SWCC).

"READY TO LEAD, READY TO FOLLOW, NEVER QUIT."

FROM THE SEAL CODE

FIGHTING IN AFGHANISTAN

In October 2001 the United States invaded Afghanistan, to overthrow the Taliban regime and destroy al-Qaeda terrorist bases. SEAL commandos participated as part of a Combined Joint Special Operation Task Force. Dropped by helicopter in hostile terrain, they searched caves and houses believed to be used by the enemy, located and directed air strikes against enemy fighters, and sought to capture or kill al-Qaeda leaders. A SEAL was among seven US special forces personnel killed at Takur Ghar in March 2002, when an attempt to establish a mountain-top reconnaissance post was resisted by guerrilla forces.

SEAL COMMANDO IN ACTION IN AFGHANISTAN

TOOLS OF COMBAT

SEAL PROTECTION
In action SEALs normally wear personal body armor, considered essential for survival in special operations. They often complement their standard-issue kit by purchasing high-quality specialist gear that is available on the market.

M16 AUTOMATIC RIFLE WITH M203 GRENADE LAUNCHER

H&K MP7 SUBMACHINE GUN

H&K MP5K SUBMACHINE GUN

IMPROVISED GUNS 1950–1980

WHEN AMMUNITION IS AT HAND, there is sometimes a temptation to fashion a weapon capable of firing it. In its simplest and crudest form, this need be no more than a piece of tubing of roughly the right diameter, a nail to act as a striker, and a means of propelling it with enough force to detonate the primer in the cartridge. Discharging such a device is likely to be at least as dangerous to the person holding the weapon as to the intended victim.

MAU-MAU CARBINE

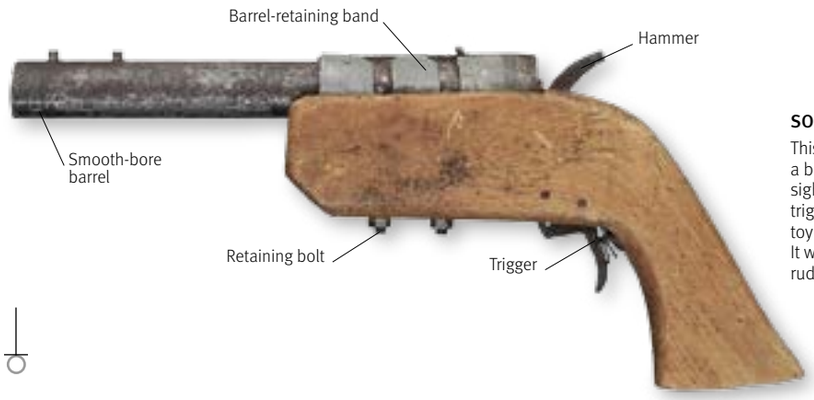
Somewhat more sophisticated than many of its type, this short-barreled, bolt-action, single shot carbine was made in Kenya during the time of the "Mau-Mau" insurrection against British rule in the 1950s. Most of the improvised weapons made by the rebels, the majority of whom were from the Kikuyu tribe, exploded when they were fired.

DATE	1950s
ORIGIN	KENYA
WEIGHT	3½ LB (1.6 KG)
BARREL	20¼ IN (51.2 CM)
CALIBER	.303 IN

EOKA PISTOL

This "gun" is so crudely fashioned that it barely qualifies for the name. The barrel is a spent 20 mm-caliber cartridge case, secured to the rough-hewn wooden frame by means of wire. For it to have been at all effective, the "muzzle" would have needed to be virtually in contact with the victim's body before the gun was discharged.

DATE	1950s
ORIGIN	CYPRUS
WEIGHT	½ LB (0.23 KG)
BARREL	4¼ IN (11 CM)
CALIBER	UNKNOWN



SOUTH AFRICAN PISTOL

This homemade pistol, recovered in South Africa, is a bit more sophisticated than it appears at first sight. It boasts a simple, single-action lock linking trigger and hammer, perhaps derived from a child's toy pistol, and can thus be used single-handedly. It would have been so inaccurate as to render the rudimentary sights redundant.

DATE	1980s
ORIGIN	SOUTH AFRICA
WEIGHT	2¼ LB (1 KG)
BARREL	8¾ IN (22 CM)

EOKA SHOTPISTOL

EOKA (*Ethniki Organosis Kyprion Agoniston*—National Organization of Cypriot Fighters) fought a guerrilla campaign against British colonial rule on the Mediterranean island of Cyprus from 1955 until 1959. During that time, small numbers of crude guns were fashioned. This all-metal gun has a simple break-open action. It fires a shotgun cartridge by means of a spring-loaded plunger.

DATE	1950s
ORIGIN	CYPRUS
WEIGHT	2¾ LB (1.25 KG)
BARREL	4¼ IN (11 CM)
CALIBER	12-BORE

FULL VIEW

LOYALIST SUBMACHINE GUN

Modeled on the World War II-vintage Sten gun, this homemade machine pistol was produced by loyalist paramilitaries in Northern Ireland. The barrel shroud and receiver have been fashioned from square-framed tubing, while the magazine appears to be that of an L2 Sterling SMG, as issued to British troops stationed in Northern Ireland at that time.

DATE	1970s
ORIGIN	UK
WEIGHT	5¾ LB (2.6 KG)
BARREL	7¾ IN (20 CM)
CALIBER	9 MM

HELMETS FROM 1900

HAVING BEEN LARGELY ABANDONED by European armies in the 1680s, metal helmets made a swift comeback amid the carnage of World War I. Although all combatants started that conflict wearing cloth or leather headgear, in 1915 they began adopting steel helmets to reduce casualties suffered through head wounds, especially from shrapnel. Broadly speaking, the same types of helmet developed during World War I served, with modifications, up to the 1980s, when all body armor was revolutionized by the introduction of synthetic Kevlar as a lightweight substitute for steel.

WORLD WAR I TANK CREW HELMET

When the British introduced tanks to the battlefield in 1916, they quickly found that the vehicles' armor gave inadequate protection to the tank crew inside. When bullets struck the armor, shards of metal flew off the inside of the hull. After early casualties, tank crews were issued with helmets and visors to protect their heads and faces.

DATE	c.1916
ORIGIN	UK
WEIGHT	MASK ¾LB (0.29KG)

GERMAN HELMET WITH BROW PLATE

Having entered World War I in spiked leather *Pickelhaube* helmets, the German army adopted the steel *Stahlhelm* in 1916. Soldiers believed to be at special risk, such as machine-gunners, were also issued with the *Stirnpanzer*, a 4mm (¼in) thick steel plate to protect the front of the head. Since these plates weighed around 4kg (9lb), they were donned for short periods only.

DATE 1916
ORIGIN GERMANY
WEIGHT 1.95KG (4¼LB)

UN SOLDIERS IN MOGADISHU, SOMALIA

United Nations peacekeeping forces are often referred to as the "blue helmets" because of their distinctively coloured headgear. These helmets thus perform a dual function, offering the soldier protection but also identifying him clearly as a peacekeeper.

BRITISH BRODIE HELMET

Designed by John L. Brodie, the "tin hat" was first used by the British army in September 1915. Made of hardened manganese steel, it was cheap to produce but offered little protection for the neck or lower head. Brodie-pattern helmets continued in use with British and Commonwealth forces throughout World War II.

DATE 1939
ORIGIN UK
WEIGHT 2½LB (1.6KG)

US AIRCREW HELMET

Steel flak helmets were adopted by US bomber crews in response to heavy casualties sustained on daylight raids over Germany in World War II. Colonel Malcolm C. Grow developed this M4 helmet when the 1944-issue M3 proved too bulky to wear in the gun turrets of bombers. He also developed light body armor, called "flak suits."

DATE c.1944
ORIGIN USA
WEIGHT 9½LB (4.28KG)

US M1 HELMET

The US Army's M1 helmet was first used in combat in 1942. It consisted of an outer steel shell with a flimsier liner inside. The shell could be separated from the liner to serve as anything from a shovel to a latrine. Evolved forms of the M1 remained in use with the US Army until the 1980s.

DATE 1940s
ORIGIN USA
WEIGHT 2¼LB (0.99KG)

NORTH VIETNAMESE HELMET

During the Vietnam War, the soldiers of the North Vietnamese Army wore varieties of headgear, including this kind of sun helmet, or pith helmet. Such helmets were made of pressed paper or, less often, of plastic. Not surprisingly, they offered no protection against the firepower of US and South Vietnamese weapons.

DATE c.1970
ORIGIN NORTH VIETNAM
WEIGHT 1LB (0.5KG)

BRITISH KEVLAR HELMET

Until the 1980s, British Army soldiers continued to wear Brodie-pattern steel helmets, similar in style to those worn in the two World Wars. These were replaced by helmets made of Kevlar – a synthetic material that, weight-for-weight, is stronger than steel, and is also heat-resistant. The shape of the new helmet also provides protection to more of the head. The helmet is often covered with DPM (Disruptive Pattern Material) for camouflage.

DATE 1990
ORIGIN UK
WEIGHT 3LB (1.36KG)

CROWD CONTROL
Bolivian riot policemen shoot rubber bullets during a strike in downtown La Paz, 2004. These are often used to aid crowd control because although they can pierce the skin, they do not cause permanent injury unless fired at short range.

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ACKNOWLEDGEMENTS

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Key: a = above, b = below, c = center, l=-left, r=-right, t=-top, f=-far, s =-sidebar

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