



VOLUME 9 HELEN OF TROY to IVY

CHILDREN'S BRITANNICA

Volume 9

HELEN OF TROY—IVY



ENCYCLOPÆDIA BRITANNICA INTERNATIONAL, LTD
LONDON

First edition 1960

Second edition 1969

Third edition 1973

Revised 1975, 1976, 1978, 1981, 1985

1987 printing

© Encyclopaedia Britannica International, Limited 1985

ISBN 0 85229 190 6

*Printed and bound in Great Britain by
Hazell Watson & Viney Limited,
Member of the BPCC Group,
Aylesbury, Bucks*

Children's Britannica

HELEN OF TROY. In Greek legend Helen, most beautiful of mortal women, was the daughter of the god Zeus and of Leda, a mortal. All the princes and rulers of Greece wanted to marry her and she finally chose Menelaus, King of Sparta. However, one day Paris, a prince from the far-away city of Troy, came to visit the king and when he saw Helen he fell in love with her. He carried her away with him to Troy, and Menelaus, distracted with grief, begged the warriors of Greece to join him in trying to win her back. A great expedition sailed for Troy.



The Trojans refused to give back the beautiful Helen to the Greeks, and so the ten years' Trojan War began.

The Trojans refused to give Helen up, and so the Trojan War, which was to last for ten years, began. During the war Paris was killed and Helen married his brother Deiphobus, but when at last the Greeks overcame the city she betrayed him to them. Menelaus had meant to kill Helen because of her treachery, but when he saw her again he threw down his sword and forgave her. They sailed back to Sparta where, in one version of the story, they lived happily until Menelaus died. (See TROJAN WAR.)

HELICOPTER. An aeroplane flies because its fixed wing provides lift when driven forward through the air. In a helicopter there is no fixed wing and lift is provided by a large propeller-like rotor which is mounted horizontally and turned by the engine. The rotor corresponds to a moving wing and its lift does not depend on the forward speed of the helicopter, which is therefore able to rise or descend vertically and to hover over one spot. The word helicopter means "spiral wing", and the idea is that it twists its

way up through the air just as a screw bites its way through a piece of wood.

The great Italian artist and inventor Leonardo da Vinci made sketches of a helicopter-like machine which he believed could draw itself up into the air if the screw were made large enough and was given suitable power. Leonardo made his sketches towards the end of the 15th century, but as engines had not then been invented the idea could not be developed. Many versions of Leonardo's design appeared in the next three centuries. Nearly all had single rotors, and the models made were useless because as the rotor was turned in one direction so the fuselage (body) spun round in the other.

However, in 1784 two Frenchmen demonstrated a small model helicopter in Paris. It had two rotors which turned in opposite directions. It was copied in 1792 by the Englishman Sir George Cayley, who in 1843 designed a power-driven helicopter with two sets of rotors, each set turning in the opposite direction. But the difficulty in those days was to find some means of propulsion lighter than the steam engine. It was not until the 20th century that a sufficiently light engine, the internal combustion engine, was invented which developed enough power to make a helicopter lift itself off the ground. (See the article AERO ENGINES.)

This happened in 1907 when two other Frenchmen, Paul Cornu and Louis Breguet, separately built machines which did rise a few metres into the air and flew for a few seconds.

Igor Sikorsky, a Russian engineer from Kiev, began work on helicopters in 1908 and by 1910 had built two helicopters, the second capable of lifting itself off the ground. Another machine, built by two Austrians, Stefan Petroczy and Theodor von Karman, was intended as a tethered observation platform for soldiers. It was reported to have flown unmanned for more than an hour. In the United States Emile and Henry Berliner built two helicopters capable of flying for several minutes, and between 1920 and 1923 another American, George de Bothezat, developed a four-rotor helicopter which made many flights, although it never rose more than two metres from the ground.

The first helicopter which successfully made a

HELICOPTER



Left: the Cierva autogyro of 1928 was the pioneer of rotary wing flight. Right: The Boeing CH-47 has two four-bladed rotors. In this experimental model, known as the 347, a controllable, tilting wing was added to improve the helicopter's manoeuvrability.

controlled vertical and forward flight was built by an Italian, Corradino d'Ascanio, in 1930. It flew for more than eight minutes. However the first practical helicopter appeared in Germany in 1936. This was the Focke-Achgelis FW-61, which had two rotors mounted on outriggers. In 1938 this helicopter was flown by the German pilot Hanna Reitsch inside the Sportpalast in Berlin. It also set international records with a speed of 122 kilometres an hour, a climb to 3,395 metres and a distance flight of 230 kilometres. (See AVIATION, HISTORY OF.)

Meanwhile Igor Sikorsky had left Russia for the United States and become an American citizen. In 1939 he flew his VS-300 helicopter with a single rotor. In a helicopter of this kind a small tail rotor mounted vertically and pointing sideways is used to prevent the fuselage spinning. In 1941 the VS-300 remained in flight for 92 minutes, a new record. By 1942 Sikorsky was demonstrating to the United States army the XR-4, the first helicopter to be built in large numbers.

After World War II interest in helicopters increased rapidly. It was realized that helicopters could carry out many useful tasks, including flying passengers between airports and city centres, crop-spraying, rescue work, mail carrying, and aerial surveys, as well as many jobs in the armed services. Many different types of helicopter were developed, mainly in the United

States and the U.S.S.R. Helicopters are also built in Britain, France, Italy, Japan and West Germany. Modern types of helicopter vary from lightweight single-rotor machines carrying a crew of two to large transport helicopters able to carry passengers and heavy equipment.

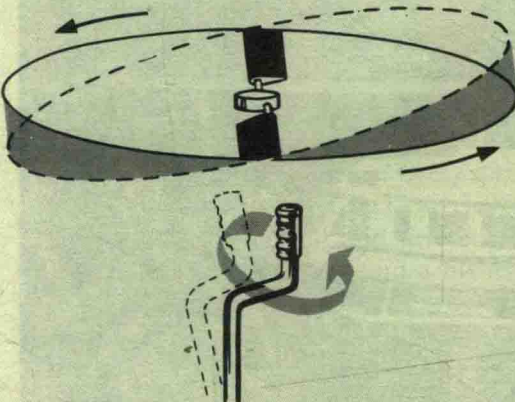
Large helicopters include the Russian Mil Mi-12, capable of carrying loads of up to 40 tonnes. Most of these helicopters have a single rotor, although some large helicopters like the Boeing-Vertol have two rotors in tandem (one at each end of the fuselage).

The first helicopters were powered by piston engines but helicopter designers showed great interest in the gas turbine engine. (See AERO ENGINES.) The lightweight gas turbine is almost vibration free and takes up little space. One of the disadvantages of the helicopter has been its relatively slow speed compared with that of conventional aircraft. However, the latest turbine-powered helicopters are capable of speeds of up to 500 kilometres an hour.

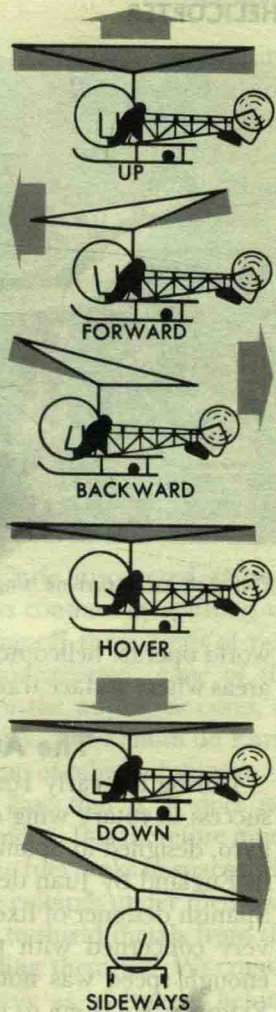
Helicopters are widely used by the world's armies for scouting, troop-carrying and for search and rescue work. Helicopter "gunships" are also used. These are fast, heavily armed helicopters which are used to support ground forces. Navies use helicopters equipped with radar and sonar to hunt enemy submarines.

Commercial use of helicopters has grown rapidly. Hundreds of companies throughout the

HOW A TYPICAL HELICOPTER FLIES



The main rotor serves the functions of wings and propeller for a helicopter. Lift is produced by changes in air pressure caused by the whirling rotor blades. The small tail rotor serves as a rudder and helps guide the craft. A helicopter can fly straight up, forward, or backward; it can hover, or fly straight down, or sideways. Helicopters usually have five controls: a **CYCLIC CONTROL STICK**, two **FOOT PEDALS**, a **COLLECTIVE PITCH STICK**, and a **THROTTLE**.



The **CYCLIC CONTROL STICK** controls the tilt of the main rotor blades and thus guides the direction of the craft. The rotor tilts in the direction that the pilot moves the stick. When it is pushed forward, for example, the craft moves forward.

The **FOOT PEDALS** are used to turn the helicopter. They control the pitch of the tail rotor blades to control the position, or direction, of the craft's fuselage, or body, during flight.

The **THROTTLE**, located on the end of the collective pitch stick, controls the engine's speed.

The **COLLECTIVE PITCH STICK** controls the angle, or pitch, of the rotor blades and thus guides the up-and-down movements of the helicopter. With it the pilot can make the craft climb (A), hover (B), or descend (C).





Keystone

This Bell twin turbine single-rotor helicopter, seen over London, is an example of the "executive" helicopter, for business use.

world operate helicopter services, particularly in areas where surface transport is difficult.

The Autogyro

During the early 1920s the most outstanding success in rotary wing discoveries was the autogyro, designed in Spain but tested and perfected in England by Juan de la Cierva. Cierva was a Spanish designer of fixed-wing aircraft who was very concerned with the danger of stalling if enough speed was not kept up in flight. (See FLYING.) He came to the conclusion that safety would be ensured if the wings were made to rotate so that they produced "lift" regardless of the forward speed of the machine. In 1920 he worked out the theory of "autorotation"; that is, he found the best angle at which the rotor blades would continue going round and support the aircraft at all times in forward flight without requiring engine power to drive them.

Cierva thus invented the autogyro, and between 1920 and 1923 he built four experimental machines. On the fourth machine he hinged the rotor blades at the hub and achieved success, because this allowed each individual blade to take up its correct position as it went round.

For take-off the engine first spun up the rotor to the correct speed, and was then de-clutched and engaged to drive the propeller as for an ordinary aeroplane. After a short run along the ground the angle or pitch of the rotor blades

was slowly increased and the autogyro lifted itself off in a fairly steep climb. Before the rotor lost too much speed the blades were set for autorotation and the machine continued on its way.

In the United States, too, autogyros aroused considerable interest and schemes were tried out to improve the usefulness of these types of aircraft. One scheme was to accomplish a "jump" take-off. This was done by over-speeding the rotor on the ground and then suddenly increasing the angle of the blades to produce sufficient lift which literally made the machine jump straight from the ground to a height of 4 to 6 metres before beginning level flight by using the forward propeller.

Very small autogyros were also built in which the rotor could be folded back when not in use and the machine driven along the road like a motor car. They could thus be kept in a garage and driven off to any convenient field for flight.

After 1946 helicopters made such progress that there was really no reason to continue building autogyros. Nevertheless, much is owed to Cierva for the work he did in paving the way for the development of helicopters.

HELIGOLAND is a tiny island in the south-east corner of the North Sea, about 65 kilometres from the mouth of the River Elbe. The islanders have an old rhyme: "Green is the land, red is the cliff, white is the sand, these are the colours

of Heligoland.” Those also were the colours of its postage stamps, when it had its own, but they are now rare.

The whole island is only about 1,600 metres long and 550 metres across, and the greater part of it is a tableland 60 metres high, falling in steep red sandstone cliffs to the sea. Every spring thousands of guillemots (see *GUILLEMOT*) arrive from Greenland and Iceland and nest on the cliffs. From the tableland, steps and a lift lead down to a lower part in the southeast where there is a good harbour, which was rebuilt after its destruction by bombing in World War II. The people (about 2,000) are descended from Frisians, a people that once lived on the coast of the Netherlands and northeast Germany, and they still speak Frisian. They grow a few potatoes and catch fine lobsters, but most of their living comes from summer visitors. Just to the east lies Düne, an island of clean white sand where holiday makers go in motor boats to enjoy the sea bathing.

Heligoland belonged to the Dukes of Schleswig-Holstein from the 14th century until 1714, when the Danes conquered it. In 1807 the British occupied it and used it as a place from which to send goods to the European mainland, thus defying the Emperor Napoleon's order that there was to be no trade with Britain. The island then became prosperous and was known as “Little London”. In 1890 it was given to Germany in exchange for Zanzibar, off the east coast of Africa. In both world wars it was used by Germany as a naval base and was strongly fortified. Before the end of World War II the houses on it were so badly damaged by British bombing that the people were taken to the German mainland. After the war the fortifications and the huge concrete shelter for submarines were destroyed and the island was used for bombing practice by the Royal Air Force. This caused many protests in Germany. In 1952 the island was given back to Germany and the islanders came back to it and rebuilt their homes.

HELIUM, next to hydrogen the lightest known gas, has neither colour nor smell. In 1868 the English scientist Norman Lockyer

examined the spectrum of the flame surrounding the Sun (see *SPECTRUM*) and discovered a new substance. He called it helium from the Greek word *helios* for “sun”. In 1895 the Scottish chemist William Ramsay discovered that helium was given off when the mineral cleveite (a substance containing uranium) was treated with an acid. Later he found helium in a lump of meteoric iron (see *METEOR AND METEORITE*) and other scientists found small quantities of it in the air. Actually, in 186,000 parts of air there is only one part of helium. In 1905 helium was found mixed with natural gas (see *NATURAL GAS*). Most helium now comes from gas fields in the United States but some is obtained in Saskatchewan, Canada.

Soon after Marie Curie discovered radium it was found that it was continually splitting up of its own accord, giving off three kinds of rays as it did so (see *RADIOACTIVITY*). One of the kinds of rays consists of the nuclei, or cores, of helium atoms (see *ATOM*). The helium on Earth comes from a splitting-up of other substances.

Helium is an inert gas; that is, it does not react with other substances. It is therefore much used for pressurizing the fuel tanks in spacecraft, which would otherwise collapse under their own weight. It is also used to shield metals from the atmosphere when welding them (see *WELDING*). Although twice as heavy as hydrogen, helium is better for filling weather balloons and airships as it will not catch fire. Helium mixed with oxygen is used as an artificial air for divers to breathe under water.

HELSINKI. The capital of Finland and its chief seaport, Helsinki (in Swedish *Helsingfors*) is situated on the south coast of the country. It was begun as a trading centre by King Gustav Vasa of Sweden in 1550. A hundred and fifty years ago it was hardly more than a village where about 4,000 people—fishermen and farmers and their families—lived on a small promontory, or headland, with the sea on three sides of it. In 1812 the Emperor of Russia, to whom Finland then belonged, decided to make Helsinki the Finnish capital, as the old capital Turku was too far away from Russian influence. A German architect was chosen and laid out



Courtesy, Finnish Embassy, London

Helsinki is Finland's leading seaport as well as the capital. The domed building in the centre is the cathedral.

the plan of the new city rather like a chess-board, with straight streets crossing at right angles and regular blocks of stone houses.

When the Finns won their independence after World War I (see FINLAND) they took a great pride in Helsinki, and Finnish architects designed some very fine buildings in the granite found in the neighbourhood. (See GRANITE.) Among these are the railway station and the parliament house. Helsinki is a well-kept and very clean city.

The port is a busy one. Coal, oil, grain, foodstuffs, iron and steel and machinery are unloaded, and timber, plywood, wood pulp, paper and dairy produce are sent abroad. From January to May powerful icebreakers keep open the channel to Helsinki through the Gulf of Finland for a small number of ships, but in about one winter in five the ice is too thick for them to break and the port is closed. Except in the hottest summer months, when all who can manage it move out into the country, the town itself is a lively centre of business and the arts. Many families have little huts in the woods or on the rocky islands near by, where they live during the short summer months. The population is more than 600,000.

HEMP. Some plants have fibres or strong threads that can be made into coarse cloth, ropes or other materials by twisting them together. The name *hemp* is given to the fibres of many plants, including Manila hemp, or abaca, and sisal hemp. True hemp, however, is a member of the mulberry family and grows in Asia. It stands from 1 to 4.5 metres high, and its leaves are divided into leaflets. The tiny flowers are yellow or green, and the pollen-bearing flowers grow on separate plants from the seed-bearing ones. Hemp requires a cool, moist climate and rich, well-drained soil.

When full grown the stalks are cut down and retted (exposed to damp) to separate the fibres. In dew retting (the American method) the hemp is soaked in dew in the fields; in water retting (the Italian method) the stalks are soaked in water. After retting the stalks are crushed and the fibre is combed out.

In the old days prisoners were made "to pick oakum", which meant that they picked old hempen ropes to pieces so as to produce a mass of tiny fibres for caulking the planks of ships. Oil and bird food are made from hemp seeds, and the leaves and roots produce a powerful drug called hashish, bhang or marijuana.

HENGIST AND Horsa. The brothers Hengist and Horsa were legendary leaders of the first Anglo-Saxon settlers in Britain. According to the historian Bede (see **BEDE**), Hengist and Horsa were invited by the British king Vortigern between A.D. 446 and 454 to fight the Picts.

The Anglo-Saxon Chronicle says that the brothers landed at Ebbsfleet in northeast Kent and that they were given this part of Kent as a home. However, they later turned against Vortigern. Horsa was killed in 455, but Hengist and his son Aesc (or Oisc) defeated Vortigern and took over the whole of Kent, driving out the Britons. Hengist is said to have died in 488, and the Kentish royal house took its name from his son.

Hengist and Horsa are said to have been Jutes. During this period Angles, Saxons and Jutes from mainland Europe were settling in Britain as the Romans left.

HENRY V (1387–1422), King of England, succeeded his father, Henry IV, in 1413 and reigned for only nine years before his early death in 1422. He was born in Monmouth and as a young man commanded the English army against the Welsh rebels, who were led by Owen Glendower (see **GLENDOWER, OWEN**). He won a series of victories against them during the period 1403–08.

The young prince had many quarrels with his father, the king, during these years. He was keen to increase the power of the English throne, and as soon as he became king he began to put into action his plans to do so. He revived an earlier claim to the French throne (see **HUNDRED YEARS' WAR**), and in 1415 he invaded France. There he won a celebrated victory at Agincourt against French forces that were much greater than those of the English. (See **AGINCOURT, BATTLE OF**.)

Returning to France two years later, he set out to conquer Normandy, Rouen, capital of northern France, surrendered in January 1419. In 1420 Henry married Catherine, daughter of the king of France, and was recognized as heir to the French throne. French resistance to his advance was not over, however, and the long military campaign began to take its toll. Henry died of camp fever at Vincennes, near Paris, in 1422.

A proud and ambitious king, Henry V

changed the course of English history during his short reign. By the time he died England had become the strongest kingdom in Europe. He was a great leader who inspired his soldiers in battle. The famous play by William Shakespeare, *Henry V*, portrays him as a reckless youth who was suddenly transformed when he took on the responsibility of kingship. The source of this play dates back to within 20 years of Henry's death, and so the picture that it paints may not be very far from the truth.

— Henry was succeeded by his infant son, Henry VI (see **KINGS AND QUEENS**). Henry VI was a weak and sickly king, and his weakness led to civil war. (See **ROSES, WARS OF THE**.)

HENRY VII (1457–1509), sometimes known as Henry Tudor, was the first of the Tudor kings of England. He reigned from 1485 until his death. After 14 years in exile abroad he landed in Wales, and, having been joined by many Welshmen, led an army of about 5,000 men into England. On August 22, 1485, he defeated and killed the reigning king, Richard III, at the Battle of Bosworth in Leicestershire. The crown, which Richard had worn into battle, was found on the battlefield and put on Henry's head.

This struggle for the throne arose because Richard was a Yorkist king, which means that he was a descendant of Edward III's third son. The Yorkists thought that they had a better claim to the throne than the Lancastrian kings who were descended from Edward III's fourth son. (The struggle between the Yorkists and the Lancastrians is described in the article **ROSES, WARS OF THE**.) Henry had strong Lancastrian claims from both his father and his mother. His grandfather, a Welshman named Sir Owen Tudor, had married the widow of the Lancastrian king Henry V, and his mother was descended from John of Gaunt, who was the fourth son of Edward III.

Henry Tudor was born at Pembroke Castle in Wales soon after the death of his father Edmund Tudor, who was the Earl of Richmond. The boy was brought up by his uncle Jasper, Earl of Pembroke. When the Lancastrian king Henry VI finally lost the throne in 1471, Henry Tudor fled to Brittany for safety.



National Portrait Gallery

Henry VII was of Welsh descent.

On the death of the Yorkist Edward IV in 1483, Henry tried to invade England but was not successful.

After his success at Bosworth in 1485 Henry was crowned in London and married Elizabeth of York, so uniting the houses of York and Lancaster. One of the Tudor badges, the Tudor rose, is a double rose standing for the joining of the red and white roses, the emblems of Lancaster and York.

For some years there was trouble with rivals and men who pretended to be Yorkist princes. The two most famous of these were Lambert Simnel and Perkin Warbeck. Henry put down all these rebellions and then set about making England peaceful and prosperous. After a century of war this was the best way of becoming popular, wealthy and powerful. Henry checked all the royal money accounts himself and as he grew older he became mean. His chief tax collectors, Sir Richard Empson and Edmund Dudley, were hated, but when Henry died in 1509

he was one of the richest men in Europe. He left over £1,000,000 to his son Henry VIII, who very soon spent it all.

Henry VII worked hard to restore law and order by making sure that rich and noble men obeyed the laws. More laws were passed by parliament to restore order and the Court of Star Chamber was used far more (see STAR CHAMBER). Parliament worked closely with the king and the government became very powerful, although there was no army and only a few officials. Abroad, Henry made treaties to help English trade and to keep England out of wars. When he died, no one was ready to rebel against the succession of his son. England was at peace.

HENRY VIII (1491–1547), King of England, was born at Greenwich on June 28, 1491. He was the second son of Henry VII and his Queen, Elizabeth of York, and was thus descended from both the families that had divided England during the recent Wars of the Roses. (See ROSES, WARS OF THE.)

Henry was a handsome young man when he came to the throne in 1509 at 18 years of age. (His elder brother had died in 1502.) Moreover, he was well educated, a good musician, a splendid rider and athlete who excelled at archery and tennis—a game quite unlike lawn tennis. (See TENNIS.) Soon after becoming king he married his brother's widow Catherine of Aragon, a Spanish lady. At first the young king spent a lot of time amusing himself, and left affairs of state to his advisers, but he was too energetic to let this go on for long and soon began to take an active part in governing.

At this time England was not a powerful country, for it had lost all its territory in France except Calais and had not yet won an empire overseas. Thomas Wolsey, who soon became Cardinal Wolsey and the king's chief adviser, was a very clever man who saw that England could become important by taking advantage of the fact that France and Spain hated each other and were both eager to gain the support of England against the other. (See WOLSEY, THOMAS.) By supporting sometimes one and sometimes the other, England could

win far more power than such a small country would normally have. Until 1525 Henry and Wolsey supported Spain, but they did not allow Spain to be absolutely sure of their support. In 1513 Henry's army invaded France to help Spain. Peace was made with France the next year, and in 1520 Henry met Francis I of France at the Field of Cloth of Gold (see FIELD OF CLOTH OF GOLD). This meeting did not produce an alliance between England and France but the Spanish feared that it would. Having made them afraid of what he might do, Henry then made an alliance with the Spanish. In 1525, when the Spanish defeated the French and captured King Francis, Henry decided that Spain was becoming too powerful and therefore began to support France.

Now Henry wanted to end his marriage to Catherine, for one thing because all her children (except Princess Mary) had died in infancy and he wanted a son to succeed him, and for another because he had fallen in love with Anne Boleyn. Wolsey had told the King that the Pope would annul (end) his marriage, and when this did not happen Henry dismissed Wolsey and appointed Sir Thomas More in his place (see MORE, SIR THOMAS). More resigned from his post soon afterwards, however, for he did not agree with what the King was doing, and Thomas Cromwell took his place as the King's adviser (see CROMWELL, THOMAS).

Between 1529 and 1536 Henry persuaded parliament to pass various acts which completely changed the way in which the English church was governed. He broke all ties with the Pope and made himself the head of the church in England. People who refused to approve of this were executed, among them Sir Thomas More and Bishop John Fisher. Having broken with the Pope, Henry married Anne Boleyn in 1533. Then he turned his attention to the monasteries and decided that they must all be closed. He did this because he wanted to get hold of their great wealth but he also had a reason for doing so because people were discontented with the church and because many of the monks had become slack and lazy. (The closing of the monasteries is usually called the Dissolution of the Monasteries.) Some people had

strong feelings about this, and in the north it led to a rising in 1536 known as the Pilgrimage of Grace. Led by Robert Aske, the rebels occupied York and took Pontefract Castle near by, but did not succeed in making the King change his mind.

Henry still had no son to succeed him, his two surviving children being Mary, daughter of Catherine, and Elizabeth, daughter of Anne. (Mary and Elizabeth both became Queens of England.) In 1536 Anne was executed on the grounds that she had not been a faithful wife, and Henry married Jane Seymour who died the next year soon after the birth of a son, the future Edward VI.

Thomas Cromwell, fearing that Spain and France were going to unite against England, persuaded Henry to make an alliance with the German princes, and to marry Anne of Cleves, a princess of northwestern Germany. Henry did not like his new wife and did not like the German alliance, for the German princes were Protestant. (Although Henry had changed the government of the English church he had no desire to change its beliefs, and always con-



Mansell Collection

Henry VIII at the age of 49, from a painting by Holbein.

HENRY THE NAVIGATOR

sidered himself a Catholic.) Henry had Cromwell executed in 1540, divorced Anne and married Catherine Howard who, like Anne Boleyn, was beheaded because she was thought to have been unfaithful. In 1543 Henry married his sixth and last wife, Catherine Parr, who survived him and married again after his death.

In spite of the fact that Henry had a number of important people and two of his wives executed, he was a popular king. Many Englishmen agreed with his changes in the church, for they wished it to be independent of the Pope. He made England more powerful and built up its navy. He gave the country strong, firm government, which was a welcome change after the disturbed period of the Wars of the Roses, and he made it possible for Englishmen to think of themselves as Englishmen, not as Yorkists or Lancastrians. His daughter Elizabeth built the glories of her reign on the foundations laid by her father (see ELIZABETH I).

HENRY THE NAVIGATOR (1394-1460). Few princes have spent so much of their lives and their wealth in encouraging exploration as Prince Henry of Portugal did in the 15th century. He was not himself an explorer, but he did so much to encourage and train others to find their way about the world that he will always be known as Henry the Navigator. (There is an article NAVIGATION.)

Prince Henry was full of curiosity about Africa and the East. It was believed that there was a Christian king called Prester John ruling in the interior of Africa, and Henry hoped to form an alliance with him against the Moors, who had just been driven out of Spain. He had his home in Portugal on a cape overlooking the Atlantic, and there he gathered scholars and sea captains from Italy and map makers and astronomers from all over Europe. His younger brother Pedro travelled to foreign lands and gathered books and maps for him. Improvements were made in the compass and in other instruments, such as the quadrant and the astrolabe, which sailors used in order to find their way about the oceans. Better ships were built and captains and men were trained to handle

them. Year after year the Prince sent expeditions to the south, farther and farther along the African coast, from which were brought back slaves and gold. In the year after his death the Gulf of Guinea was reached. By 1487 Bartholomeu Dias had rounded the Cape of Good Hope and ten years later Vasco da Gama reached India by sea. (See DIAS, BARTHOLOMEU, and GAMA, VASCO DA.) It was the work of Prince Henry that had made these voyages possible.

HEPHAESTUS was the Greek god of fire, and the blacksmith of the gods. The Romans called him Vulcan, and there is an article about him under that name which gives some of the stories told of him by the Greeks and Romans.

HERALD. In ancient Greece and Rome heralds were employed to make proclamations and carry messages both in war and peace. They acted as ambassadors and nobody was supposed to harm them. In the middle ages they began instead to play a part in tournaments and jousts, in which knights on horseback fought with lances. The heralds proclaimed the tournaments beforehand and went in front of the knights to cry their names in the various events and to announce the winners. Some of them were employed permanently by great lords but others wandered in bands from one place to another, seeking out tournaments where they might be needed. Those who belonged to great households sometimes became officers, or kings of heralds as they were called, with authority over others.

Gradually, during the 14th century, heralds became more important as personal representatives of their lords. More and more lords began to have special signs on their shields and surcoats (loose robes worn over their armour). Because these signs were borne by knights in armour they were called armorial bearings, and as heralds began to do the job of recording them the system of signs became known as heraldry. (See HERALDRY.) It was important to see that no two knights used the same sign, for when they were in battle armoured knights were recognized by their bearings. Heraldry still record and control armorial bearings, or coats of arms as they are often called, and people who wish to have one

must apply to the principal heralds, who are called kings of arms.

In England the heralds form what is known as the College of Arms, or Herald's College. This consists of the Earl Marshal (the Duke of Norfolk); three kings of arms called Garter, Clarenceux, and Norroy and Ulster; six heralds (Chester, Lancaster, Richmond, Somerset, Windsor and York); and four junior officers called pursuivants (Bluemantle, Portcullis, Rouge Croix and Rouge Dragon). In Scotland the chief herald is the Lord Lyon King of Arms. Besides dealing with armorial bearings, the heralds trace and record the line of descent of families and take part in certain state activities, such as coronations.

HERALDRY. The word "heraldry" originally meant all the duties of a herald (see **HERALD**). Now it is used to mean only that part of his original duties which had to do with the use of armorial bearings, often called "arms".

Armorial bearings began as the designs which knights placed on their shields from the 12th century onwards. For some time before that knights had worn helmets with long nose pieces that covered a large part of the face, but in the 12th century they began to wear helmets that covered their faces completely. To enable themselves to be recognized by their friends and followers, and so that they should not be mistaken for enemies, they put distinctive designs, often called "cognizances" or "devices", on their shields and also on their lance pennons. Each knight chose a device that was different from every other knight's and always used the same one. Thus he came to be known by it. By 1200 many nobles and important knights had such devices, or arms, on their shields and by 1300 all knights used them. They also put their arms on the seals they used for signing documents.

At first arms were plain and bold, because they had to be seen clearly at a distance on the battlefield. Some men merely divided their shields into sections or took a cross or some other simple shape, and painted the design in two different colours. Figures 1 to 12 are examples of this. (Although these illustrations are in black and white, the actual colours were bright and

contrasting.) Others chose some sort of picture such as that of a lion (13), an eagle (14), a weapon or a fleur-de-lis (15). (There is a separate article **FLEUR-DE-LIS**.) Any object might be chosen, and figures 16 and 19 show other common heraldic emblems.

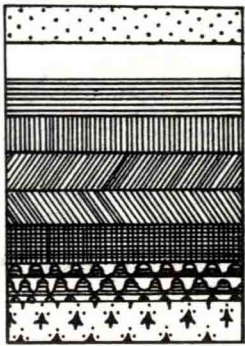
Some men had arms consisting of a group of emblems. Thus the kings of England from Richard I (1189-1199) onwards had three gold lions on a red ground, arranged as in figure 26. Sometimes the simple divisions and shapes were combined with other emblems, as in figures 20 to 23. Furs were sometimes used as a background and sometimes in the treatment of devices. The most common were ermine and vair which were represented as shown in figures 24 and 25. It is difficult to recognize vair as a fur, but it represents small skins sewn together in rows, silver and blue skins alternating. The ermine is shown as silver or white flecked with little black tails.

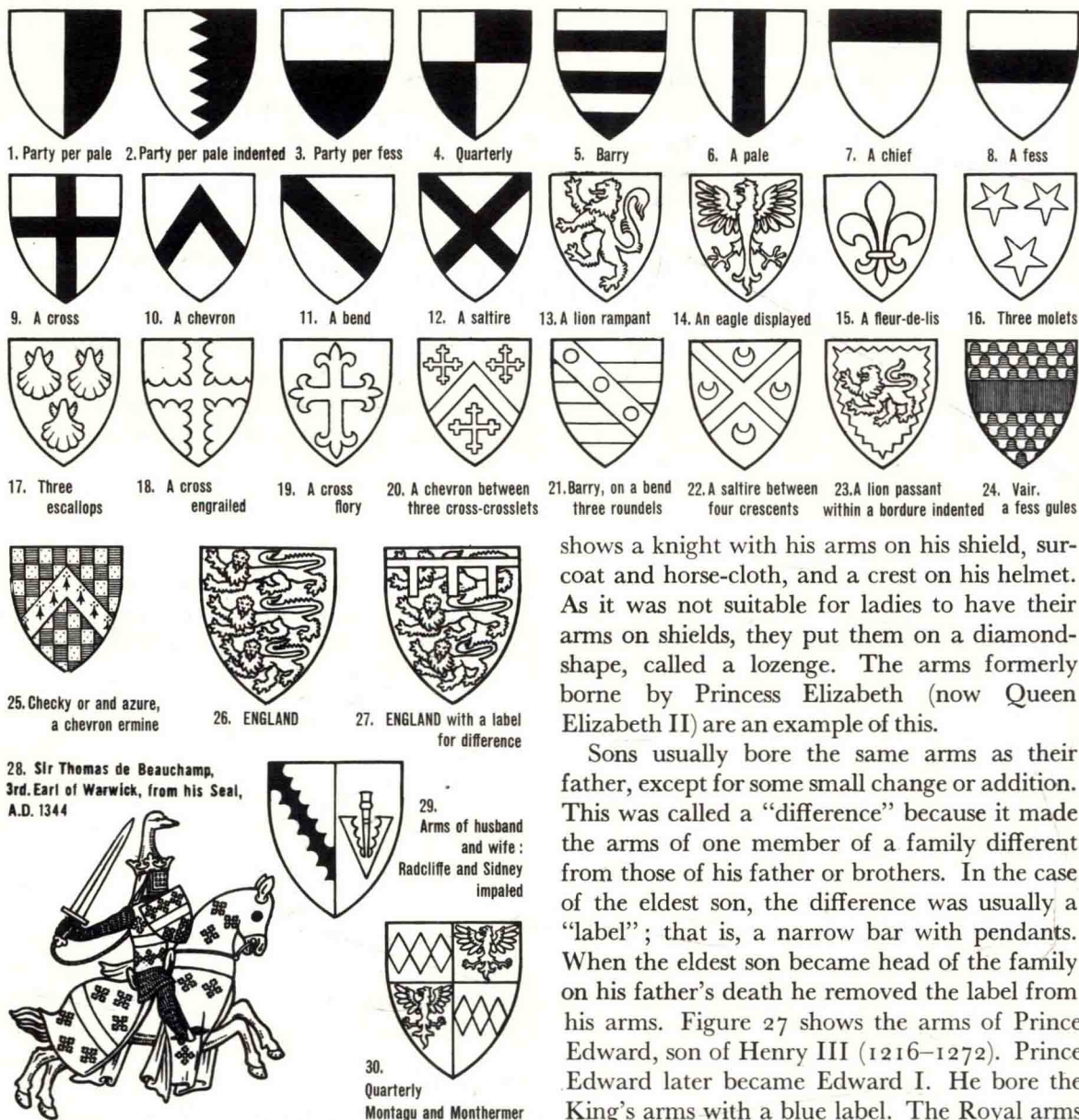
Many men chose arms that illustrated their names. Thus a man called De Lucy put on his shield three lucas (the fish now called pike), Corbet had two corbies, or crows, and Trumpington two trumpets. This type of heraldry was quite common and very sensible because it helped people to remember the arms more easily.

The colours used in heraldry were blue, red, green, purple and black. In addition to these there were gold and silver, but they were regarded as metals, not as colours.

In the 17th century a method of representing metals and colours by dots and lines was invented, so that it was possible to show them in uncoloured drawings (figures 24 and 25). The metals, colours and furs of heraldry are known as "tinctures" and have special names:

METALS	Gold	Or
	Silver	Argent
COLOURS	Blue	Azure
	Red	Gules
	Purple	Purple
	Green	Vert
	Black	Sable
FURS	Vair	
	Ermine	





shows a knight with his arms on his shield, surcoat and horse-cloth, and a crest on his helmet. As it was not suitable for ladies to have their arms on shields, they put them on a diamond-shape, called a lozenge. The arms formerly borne by Princess Elizabeth (now Queen Elizabeth II) are an example of this.

Sons usually bore the same arms as their father, except for some small change or addition. This was called a "difference" because it made the arms of one member of a family different from those of his father or brothers. In the case of the eldest son, the difference was usually a "label"; that is, a narrow bar with pendants. When the eldest son became head of the family on his father's death he removed the label from his arms. Figure 27 shows the arms of Prince Edward, son of Henry III (1216-1272). Prince Edward later became Edward I. He bore the King's arms with a blue label. The Royal arms have changed a good deal since the 13th century, the modern ones including the red lion of Scotland and the harp of Ireland.

The arms and crest were used only by members of the family to whom they belonged and not by the men-at-arms who followed them in war. To provide a device by which their followers might be known, many nobles and knights adopted badges in addition to their arms. Badges were not placed on the men's shields, but were worn on their breasts or shoulders. They

At first knights placed their arms only on their shields and flags. In the 14th century they began to wear sleeveless tunics (called surcoats) over their armour and put their arms on them also. Thus the surcoats came to be known as coats of arms, and this term is often used in modern times to mean the arms themselves. When taking part in tournaments, knights often put an emblem, called a "crest", on top of their helmets (see CREST; TOURNAMENT). Figure 28



This replica of the surcoat of the Black Prince, bearing his heraldic devices, hangs above his tomb in Canterbury Cathedral, where the 14th-century original is also preserved.