Glossary of Ironwork Terms
Acknowledgements
Principal author: Peter Parkinson, DesRCA, FWCBI, LWCB
Contributing author: Chris Blythman, AWCB, LWCB
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About the principal author
Peter Parkinson is a retired artist blacksmith, now living in Cornwall and still making small pieces of work. He studied at the Royal College of Art and worked as a designer in London, Transport Architect’s Department, and Allied Ironfounders, before becoming a Senior Lecturer at the University College of the Creative Arts in Farnham, for 25 years, latterly developing and teaching on a BA (Hons) course involving studies in blacksmithing, silversmithing and jewellery.

He left Farnham in 1992 to run his own business in Hampshire, designing and making forged architectural metalwork and public art, installed in many cities in Britain, including Basingstoke, Blackburn, Bradford, Crawley, Dorking, Guildford, Leicester, Leatherhead, London, Middlesbrough and Portsmouth. He has been involved in teaching, judging and lecturing at blacksmithing events in the UK, Belgium, Italy, Sweden and America.

He has written books on blacksmithing and sculptural metalwork and continues to write articles for Artist Blacksmith magazine, the journal of the British Artist Blacksmiths Association.

About the contributing author
Chris Blythman, AWCB, LWCB, started blacksmithing seriously at the age of 43, previously having had careers in cartography, land survey, construction and briefly worked as an Umpa Lumpa at Rowntree’s in York (!).

He set up as a self-employed blacksmith having completed an HND at Herefordshire College of Art, specialising in reproductions of period ironwork for museums, heritage sites and exhibitions in Europe and America.

He taught blacksmithing at Hereford for 13 years before retiring in 2016.

About the NHIG
The National Heritage Ironwork Group (NHIG) was formed in 2009 to raise awareness and promote understanding of heritage ironwork in the historic environment. Traditional forged and cast ironwork is an important and integral part of the historic environment, used widely in structural, architectural and functional applications.

The NHIG intends to set up a nationally accredited training and development programme to ensure that the skills of the Heritage Ironworker and Blacksmith are recognised, preserved and promoted.

It is the duty of all professionals and practitioners to promote good conservation practice in order to safeguard the long term survival and integrity of heritage ironwork. This document has been developed to help owners, professionals, blacksmiths, and conservation metalworkers to uphold best practice in the care of heritage ironwork.

The purpose of this Glossary is to provide a reference, defining words to make it possible for more precise and relevant conservation tenders to be written; and assisting conversations between blacksmiths, architects, commissioners and others by offering clearly defined terminology. It may also enable others to better appreciate and understand what is involved in the work.

The Glossary is available on the NHIG website, at nhig.org.uk, and it may be consulted by anyone involved in commissioning, tendering or specifying conservation and restoration work, or simply interested in blacksmithing.

The words and terminology necessary to the Glossary cover a number of distinct specialisms. These include terms relating to blacksmithing practice, conservation, art history, engineering, metallurgy, welding, corrosion treatment, metal-finishing and architecture. So the Glossary is something of a language mongrel. Each of those specialisms has its own more detailed vocabulary.

Metalworking and art and architectural history for example, span millennia so it is no surprise that terminology has changed over time, or that the same word has come to mean many different things. For example the word ‘Forge’ has at four distinct meanings. As it stands, this Glossary is work in progress – and it always will be, as the craft develops and new processes and terms come into use.

Peter Parkinson, November 2017
Acanthus leaf A classic ancient decorative motif deriving from the leaf of the Mediterranean acanthus plant.

Alloy A mixture of metals, or a mixture of metal and nonmetallic elements. In practice, most metals are used as alloys.

Anchor points Connections between the ironwork and the ground or stonework.

Andirons Stands, used in a hearth to support a fire grate or to support burning logs.

Angle grinder A hand electric tool with detachable discs for grinding, cutting, shaping and refining surfaces, wire brushing, and paint stripping.

Angle iron An iron or steel section rolled to a right angle.

Anneal Heat treating metal to reduce its hardness and relieve internal stresses.

Anthemion A classic decorative motif derived from the opening honeysuckle flower.

Anvil The massive iron or steel tool on which a blacksmith hammers hot metal to shape. Most anvils have a long conical ‘bloc’ or ‘beak’ at one end and a long flat working ‘face’, with a square handle hole. In Britain a ‘London pattern’ anvil has a long rectangular flat face, with small flat ‘tables’ between this and its tapered beak. A ‘Portsmouth pattern’ has a long face tapering to a narrow end, and a tapered beak.

Anvil tools Tools with a square shank, designed to fit the handle hole of an anvil. Collectively these are known as ‘bottom tools’. See ‘Top and bottom tools’.

Arcade or arcing A decorative device involving repeated arch forms, either structural and decorative as in a freestanding covered walk, or purely decorative as a flat pattern.

Arris The sharp corner of a metal section, where two surfaces meet. Square section railing uprights, made with this corner facing out, are described as ‘set on the arris’.

Back bar See Back side.

Back stay A stay or bracket, often used to provide rigidity to a fence or a run of railings, providing an angled bracing piece between the raking and the ground.

Back stile The vertical bar of a gate frame, on which it hinges. Since this carries the weight and pivoting load of the gate, it is usually the heaviest bar in the structure. See also Side.

Baluster One of a series of vertical supporting elements of a balustrade.

Balustrade A series of balusters topped by a rail, guarding the edge of a staircase or drop.

Bandsaw A workshop machine employing a continuous flexible saw blade. Capable of making both straight and curved cuts.

Banister or Bannister See Balustrade.

Bar A length of solid metal of a particular section – e.g. round bar, square bar, rectangular bar, flat bar, hexagonal bar, octagonal bar etc. See also Rod and Strip.

Baroque An elaborate decorative style rather than a historic period. Originating in Italy in the early 1600s, it used curving lines and architectural elements applied as ornament.

Bead 1) A narrow continuous edging applied to a plate or panel, often in the form of a semi-circular section.

Bearing The component in which a pin or shaft rotates or slides. If the pressure on the bearing is at right angles to the axis of the shaft, it is a ‘journal’ bearing. If the pressure is parallel to the axis of the shaft and the end of the shaft sits in the bearing, it is a ‘pivot’ bearing. See Journal and Pivot.

Beading A decorative moulding with the appearance of a row of beads.

Bench vice Vice bolted to a workbench with parallel jaws operated by a screw. Sometimes called an engineer’s vice.

Bench work Work carried out cold at the bench, filing, drilling and sawing, for example.

Best iron Puddled iron bars having been twice refined from muck bar. Usually stamped ‘best’ with a crown.

Bevel 1) An angled face, often at 45°, refining a sharp, right-angled edge.

Bezel A frame or rim used for example, to retain the glass over a clock face.

Bick or beak The round tapering projection at one end of an anvil.

Billet The initial mass of metal to be processed to size and section, in a rolling mill. This may also be known as an ingot.

Bird’s mouth The concave shape formed in the end of a bar or tube to accept the profile of a round bar fitted to it at right angles.

Bit The jaws of blacksmithing tongs. For example the tongs with plain flat jaws are described as ‘flat bit tongs’.

Black mild steel Low carbon steel, hot rolled to the required section. The heat leaves a dark grey or ‘black’ oxide coating. Widely used by blacksmiths. See also Bright mild steel.

Blacksmith A skilled, creative crafts-person who forges iron, steel and other metals. Often shortened to ‘smith’. See Smith.

Blast furnace A large furnace in which iron ore is reduced to iron metal in contact with burning coke, or historically with charcoal. Heat is achieved by blowing large volumes of air into the furnace. Ore, coke and limestone flux are fed into the top, and metal and slag are tapped periodically out at the bottom. The product is pig iron containing up to 4% carbon.

Blockings The swelling at the edges of a bar produced when metal is displaced by hot punching a hole. This usually rounded form may be forged to produce ‘square blockings’.

Blobbery, Bloom Hist. Works or hearth where wrought iron was manufactured by direct reduction from iron ore, using charcoal as fuel operating at below the melting point of the metal. The bloom is the incandescent mass of raw wrought iron from the furnace prior to forging into a billet. See also Firebox and Chafery.

Blower Mechanical fan used to blow blacksmith’s fire.

Bolster A tool usually used over the handle hole of an anvil to avoid undesirable distortion when a drift is driven through a hole in a workpiece.

Bolt 1) A fixing comprising a headed Shank, threaded part way to accept a nut, or to fit a threaded hole. The plain length of the shank is intended to match the thickness of the material being fixed. A similar fixing threaded for its entire length is called a Machine screw.

Brazing A form of hard soldering using a brass (copper/zinc alloy) filler rod, and an appropriate flux, melting at between 800°C- 900°C, to join other metals, particularly steel. The term is now applied to a wide variety of different, non-brass alloys, formulated to solder a variety of metals.

Bright mild steel Black mild steel with the oxide coating removed and the section cold rolled or drawn through a die. The result is work-hardened metal with a more precise section and a bright surface. Once heated in a forge fire, the bright surface returns to a ‘black’ colour.

Bronze Strictly defined as an alloy of copper and zinc. A good forging grade of brass is 60% copper and 30% zinc. Gilding metal, ‘red brass’, is 90-95% copper and 10-5% zinc. Some bronzes are confusingly called ‘bronze’. Bronze is an example.

Burr A thin, undesirable rough or sharp edge left after filing, cutting or drilling metal.

Caliper A tool for measuring either internal or external lengths, employing two pivoted legs. See also Vernier caliper.

Candelabra A multi-branch candleholder.

Candelabrum A holder for a single candle.

Candleholder A holder for candles.

Candlestick As candelabrum.

Carbon An alloy or link components at other angles. A right angled bracket fixed to a vertical surface provides the support for a horizontal shelf. A bracket may be a single piece of metal or an elaborate decorative construction serving the same purpose. See also Hanger bracket.

Brass Strictly defined as an alloy of copper and zinc. A good forging grade of brass is 60% copper and 40% zinc, containing no tin at all. Silicon bronze and aluminium bronze are examples.

Carbide tipped tools These employ small, hard tungsten carbide tips providing the cutting edges, to improve performance when working hard and abrasive materials including masonry, and to extend tool life when cutting other materials. Tools include drill bits, circular and straight saw blades and lathe tools.
Cold chisel

A hardened steel chisel shaped and sharpened to cut cold steel.

Cold rolled (adjective)

Metal sheet and plate rolled cold between polished or textured rollers to impart a particular surface. The cold rolling of steel bar can be used to impart a bright, smooth surface. See also Hot rolled and Rolling mill.

Collar

Also called a 'clip'. A forged metal band pre-shaped to hold two or more components together, side by side. The collar is heated to enable it to be fitted, then clenched in position red hot, using clip or bow tongs and/or tightened in place with a hammer. As the collar cools it contracts, creating a firm joint.

Cone mandrel

A sometimes large conical cast iron former, over which different size rings and curves can be dressed to shape.

Conservation

Measures and actions aimed at safeguarding cultural heritage items, while ensuring their accessibility to present and future generations. Measures should respect the significance and the physical properties of each item. See also Preventive Conservation, and Remedial Conservation.

Copper

The familiar, heavy reddish metal, widely used for electric wiring, water pipes and roof sheeting, its colour and malleability lends itself to decorative applications.

Coquillage

Hist. A shell ornament.

Core rail

The flat bar which follows the line of the string of a staircase. A core rail provides the template and support for a timber or metal handrail. See String.

Corrosion

The conversion of metal into metal oxides, sulphides and salts, eating away the metal, when exposed to both atmospheric air and water. The corrosion products of iron and steel are physically larger than the metal they replace, so they expand and fall off, allowing more metal to corrode. Conversely, the oxides created by corrosion on stainless steels and aluminium form a protective layer, inhibiting further corrosion. See also Galvanic corrosion.

Cotter pin

A tapered pin usually used to lock a component to a shaft (e.g. a bicycle crank) or driven transversely through a larger pin such as a drives pin or shaft to secure it.

Corrosion protection

A broad category covering many different systems. Many involve coating the metal with waxes, paints, lacquers, plastics, or metals less likely to corrode. Since corrosion occurs when both water and oxygen is present, the avoidance of water traps, joints and crevices, is also important.

Countersink

The bevelled mouth of a hole, corresponding to the head of a countersunk screw, allowing it to be fitted flush. A Countersink is also the shaped drill bit, used to bevel the hole.

Creasing (verb)

Making a long sharp bend, usually in sheet metal.

Crenellation

Hist. A repeated pattern of square blocks and indentations, similar in form to battlements. The solid section is called a ‘merlon’ and the open section an ‘embrasure’.

Cresting (noun)

A decorative element attached to the tops of gates or overthrow.

‘C’ Scroll

A forged element comprising a pair of scrolls forming the shape of a letter ‘C’.

Crimping tool or Stake

An anvil tool with a rounded concave form, used to forge a wavy edge or crimp.

Crowning

Decorative elements attached to the top of a pilaster, post or standard.

Crown Iron

Puddled wrought iron having been once refined from a muck bar; usually stamped with a crown. Another refining by piling, welding and rolling produced best iron. Still further refining resulted in double best or best best iron. See Muck bar and Best iron.

Crucible

Refractory container of fireclay or graphite used to transfer molten metal from furnace to mould.

Cutting oil

A special oil and water mixture widely used for lubricating the cutters of machine tools, to improve their performance and cool the workpiece.

Cypher

A monogram comprising initial letters designed to form a decorative ironwork element. Often used to record a family name in the overthrow of a traditional gate.

Damascening (noun)

A technique for decorating the surface of iron or steel with a fine wavy pattern often inlaid with precious metal.

Damasceened steel

A confusing term. Not steel from Damascus, or damascened steel. Now often used to describe what might better be known as ‘pattern welded steel’. Layers of iron and steels fire-welded together, to produce a pattern which runs through the thickness of the metal. Now used for decorative purposes, this originally served to provide the hardness of steel and the resilience of iron in edge tools and weapons.

Die

1) A concave tool used as a mould to create a particular form in hot metal. For example, tools used to form balls, beads, acorns and other decorative shapes.

2) A precision tool used to cut a particular external screw thread in cold metal.

Direct reduced iron

Wrought iron produced in a bloomery furnace in which the ore and charcoal were intimately mixed. See Bloomery.
Dividers A hand tool with two pivoted legs, ending in sharp points. Used to scribe circles, measure distances and set out repeated measurements.

Dog bars the short vertical bars, set in between the main uprights of a traditional gate, narrowing the spaces through which a small dog might otherwise escape.

Dovetail joint A wedge shape formed on the end of a bar; attached by the narrow end, fitting into a corresponding hollow form to create a connection. The dovetail will tighten under longitudinal loads, but may be undone by pulling sideways.

Dowel pin See pin.

Drawing down Tapering the act of progressively reducing the size of a metal section along a bar, by hammering.

Draw filing Filing by holding the file in both hands at right angles, for example to the flat face of a square bar, working it back and forwards to achieve a fine surface.

Drift A tapered tool of a particular section hammered through a punched or cut hole to refine its shape and size. The drift may be hardened or is often made from mild steel. See Funching.

Drill A rotary cutting tool for making holes, hand or power operated. A Drill bit provides the cutting action.

Drip pan The part of a candleholder designed to catch any overflow of wax.

Drop bolt See Bolt.

Drum A large shaped jig or former used to set out the stairs, balustrading or handrails, of a circular or elliptical staircase.

Emery paper & cloth An abrasive paper for metal finishing. Emery cloth is tough and flexible more easily pulled from side to side around curves.

Engraving Decorative the surface of metal, by cutting into it with hammer and chisel; using an engraver’s burin, pushed by hand; or with a cutting tool in an engraving machine. Often used to apply lettering.

Escutcheon 1) A shield shaped plaque, often carrying a coat of arms, on gates and overthrows. 2) A plate around the keyhole or behind the rotating handle of a door.

Etching A chemical process, using acids to dissolve metal. For decorative purposes, a suitable resistant coating is used to mask out a pattern or lettering.

Etch Primer Usually required to ‘key’ paint to metals such as zinc or aluminium, either as a primer paint or a chemical solution, known as a ‘mordant’. See Mordant.

Expansion bolt A bolt system providing either male or female connections in masonry. The fixing is inserted in a drilled hole and expanded to lock it in place. Some expand as the fitting is screwed in, others are expanded by a hammer blow, driving in an internal wedge.

Eye A ring formed by bending part of a bar into a circle.

Faggot weld Two bars laid parallel to one another and forged welded.

Fanlight A type of decorative window over a door, often semi-circular in shape, which became popular in the eighteenth century.

Farrier A specialised blacksmith who has veterinary skills in shoeing horses.

Feather edge A very thin, delicate edge.

Fence A barrier dividing areas of land.

Fettling (verb) To ‘clean up’, by removing sharp edges or rough areas of metal, usually in preparation for applying a finish.

File A hard steel hand tool for removing metal to smooth or refine its form.

Finery Hist. Works or heath where charcoal iron was made from cast iron pigs, using charcoal as fuel.

Finaud The decorative detail terminating a pinnacle, or the vertical element of a gate frame, post or railing.

Finish The visible treatment of a piece of ironwork, the final coat or surface.

Finishing (verb) All the processes used to fettle, clean, prepare and apply a preservative or decorative finish – or both to a piece of work.

Fire welding (Forge welding) The blacksmith’s traditional way of welding iron and steel using the forge fire to raise the temperature of the metal components until the joining surfaces are molten and ‘sticky’. The two pieces are quickly brought into contact, and welded by swift hammer blows. Sometimes a flux is used to assist the process.

Fishtail A flat, flared termination or ‘hib’ to a bar or scroll.

Fixing 1) verb – The activity of installing a piece of work on a site. 2) verb – in American English, fixing tends to mean ‘repairing’. 3) noun – A connecting device such as a bolt or screw.
Gate
A frame and infill designed as a barrier which opens and closes. A hinged panel, providing security to a building or garden. A gate may be similar in appearance to other panels of decorative metalwork, such as railings or balustrades, but it is more structurally demanding to design and make, since it is subject to asymmetrical loads.

Gilding
The application of gold leaf to a surface, for decorative purposes. Gilding may also provide some corrosion protection.

Gilding metal
A particular brass alloy of 5-10% zinc and 95-90% copper. A hot forgeable low zinc brass.

Gouge
A chisel with concave cutting edge.

Grain
Caused by the admixture of slag in wrought irons. Equivalent to the grain in timber.

Grille
A panel of metalwork often fitted over a well, or into an opening in a building to provide security or to secure posts or fixings.

Grub screw
A short headless screw, turned using a screwdriver slot or hexagon socket in one end. Often used to secure a pin in an assembly, or a pulley to a shaft by applying sideways pressure. Called a 'set screw' in America.

Guardrail
A railing or barrier designed to guard a drop, or prevent people or vehicles from accessing dangerous areas.

Hammer
The essential tool of the blacksmith. The hammer head usually has a square or round face. The end opposite the face is called the Pin. See Pin.

Hammersman
1) Hot, The blacksmith's assistant who tends the fire and uses a sledge hammer, directed by the smith. See Striker.
2) The blacksmith who operates the hand controls of a very large power hammer, as part of a team.

Hand hammer
A hammer designed for use in one hand.

Handrail
A rail, which may form part of a balustrade, designed to offer support when ascending or descending stair.

Hanging bracket
A decorative bracket designed to support a flower basket, lamp, or other item.

Heading up
The action of creating a head on the end of a rivet or tenon to complete the joint.

Hearth
The blacksmith's fireplace.

Heat
Blacksmiths refer to heating a piece of metal as 'taking a heat'. A heat also describes the period of time during which the metal remains hot enough to be workable.

Heat treatment
The heating of metal to alter its condition, hardening, tempering or annealing the metal.

Heel
The heavy, heaviest end of a bar, integral with a tenon joint in the frame of a gate, or other structure. The heel provides a deep shoulder to the tenon, enhancing the rigidity of the joint. The bottom bar of a gate made in this way, is referred to as the heel bar. Any bar with a tenon may include this detail.

Heel bar
See above.

Helical
See Spire.

Hinge
The joint which enables a gate or door to turn.
Lock or Locking rail
Generally two parallel horizontal rails in a gate, between which a lock is fitted. The remaining space between the rails is often filled with scrolls or other decorative work.

Lug
A small projection from a structure, often to provide a location or connection.

Lyre
Ironwork panel that consists of scrolls, bars and decorative features arranged to form the outline shape of a lyre, a stringed instrument used in Ancient Greece.

Machine screw
A metalworking screw threaded along its entire length. A bolt is partly threaded for a distance at the end. Both may be fitted through materials to be joined and secured with a nut, or used in a tapped hole.

Machining
The shaping of metal by cutting away material, using a drill, lathe or milling machine.

Machine vice
A vice designed to hold a workpiece on a machine, such as a drill or milling machine.

Mandrel
A rod or shaped spindle over which hot metal may be wound, for example to make a helical spring. A metalworking screw threaded along its entire length. A bolt is partly threaded for a distance at the end. Both may be fitted through materials to be joined and secured with a nut, or used in a tapped hole.

Mask
A reprocast or cast metal image of a human, mythological or animal face, used as a decorative element.

MIG welding
Metal Inert Gas Welding. An arc welding system using inert gas shielding and a mechanical wire feed to provide filler metal. The filler metal is of the same chemical composition as the metal being joined.

Micrometer gauge
Also called a ‘micrometer screw gauge’. A precision tool for making small measurements.

Mild steel
An alloy of iron with less than 0.25% carbon, often also with a small percentage of manganese, containing too little carbon to be easily hardened when quenched. Mild meaning soft.

Mill scale
Oxide layer left on the surface of iron or steel after hot rolling or forging to its finished shape. Light grey in colour.

Milling machine
A precision machine tool which shapes workpieces using rotating cutters.

Monkey tool
A blacksmithing tool to square up the shoulder of a forged tenon. Usually a rectangular steel block with a hole at one end, to accept the tenon, square to the end face. The tool is driven over the hot metal with a hammer.

Monogram
See Cypher

Mordant
A chemical etching solution. A mordant known as ‘T’ wash, is widely used to etch zinc galvanised metal with a hammer.

Mortise
The hole through a component, shaped to take a tenon.

Mortise and tenon joint
A joint historically deriving from woodwork practice. The tenon passes through the mortise and the projecting end is either hot forged to create a riveted head, or is provided with a transverse hole enabling a retaining wedge or pin to be driven through.

Motif
An established decorative design element. Particular types of scrolls, the water leaf and the quatrefoil form are examples.

Moulding
1) noun – A shaped section of material used as a decorative ‘trim’, but not necessarily made in a mould
2) verb – Making the mould for a casting.

Muck bar
Bar produced by the first rolling of puddled iron. Subsequently piled, welded and rolled to create a crown iron. See Crown iron.

Mullion
The vertical member dividing windows.

Newel post
1) The central column around which a spiral stair winds.
2) The main post supporting either end of a stair, handrail or balustrade.

Nib
1) The end detail of a scroll. See Scroll.
2) A small pointed projecting part.

Nosing
The front edge of the tread of a stair, often rounded and projecting over the riser below it.

Nut
An internally threaded fixing, used to secure a screw or bolt. Now usually hexagonal, but historically often square.

Offering up
Trying a component in position, or over a layout drawing to check it, or to mark from it for example to locate holes.

Overthrow
A panel of ornamental ironwork running above an gate, bridging from one pier to another, often including the initials or coat of arms of the family.

Overthrow base frame
See Stretcher frame.

Pales, palings, pickets
or palisades
The repeated upright bars in fences and gates.

Palmette
A classical decorative motif, loosely based on a palm leaf. Sometimes almost indistinguishable from an anthemion. See Anthemion.

Panel
An area of decorative metalwork forming an element in a larger structure such as a screen or grille, or between the posts of a railing or balustrade.

Pattern
1) A decorative arrangement of elements, either two or three dimensional.
2) The three dimensional form of an object to be cast in metal. In sand casting, sand is rammed around and over the pattern, which when removed leaves a cavity of the required shape.

Pattern maker
The skilled craftsmen who make patterns in a foundry.

Pediment
A decorative motif deriving from the low triangular gable of classic Greek and Roman architecture.

Pein, Pane or Peen
The end of a hammer head opposite to the face. A ball pein hammer has a hemispherical peen; a cross pein hammer has a fullering peen set at right angles to the hammer shaft; a straight pein hammer has a fullering peen, set in line with the hammer shaft. See also Hammer.

Picket
Often American usage. The repeating upright of a fence or railing. See also Pales.

Pickling
Cleaning a metal by immersion in acid. Forged mild steel may be stripped of oxide scale in sulphuric or phosphoric acid solutions. Forged stainless steels are pickled to remove iron particles contaminating the surface, picked up from the tool used to forge them.

Pier
A pillar with all four faces decorated, often the post on which a gate is hung. This may be masonry, cast iron, or a forged construction.

Pig iron
A high carbon iron as tapped directly from a blast furnace into “pig” moulds in a sand floor. Contains up to 4% carbon. Used as the feedstock historically for wrought iron production, later for cast iron and steel production.

Pilaster
This has the appearance of a pier or pillar but has little depth. In ironwork it is a single, narrow flat panel.

Pillar
Masonry or ironwork upright, to which a gate or side panel is attached.

Pin
Usually cylindrical in section, large or small pins are used to secure, pivot or locate. Clevis pin – Has a shank with a head at one end and a cross-drilled hole at the other. It is used as a pivot to connect components which can rotate relative to each other. Dowel pin – A parallel pin fitted in a holes to locate but not retain two components. Roll pin – A cylindrical, hollow, “C” section pin of spring steel, designed to flex to retain it in a drilled hole. Split pin – A pin made from half round wire, with one looped end and the other projecting through a hole, passed for example through the cross-drilled hole in a Clevis pin or screw and splayed out to retain it. Taper pin – Tapered to fit in a hole reamed to a corresponding taper, to lock two parts together. See also Pivot.

Pintle hinge
A hanging suitable for a light gate, consisting of top and bottom wall or post fixings, with vertical hinge pins, engaging with holes in stub bars projecting from the back stile of the gate. These hinges carry the entire weight of the gate.

Pitch
A black viscous resin, traditionally obtained from a pine tree. Used in a tray as a ‘pitch block’, to support metal sheet metal formed by repoussé.

Pivot
An engineering term for a bearing carrying a load parallel to the axis of the shaft, but commonly used for any shaft or pin on which something turns. A traditionally constructed gate often uses an integral pivot pin at the bottom of the back stile, rotating in a socket set into the ground to take the weight of the gate.

Planish
To refine and polish the surface of a sheet metal form by hammering.

Plate
Thick sheet metal, above some 3mm in thickness.

Plasma cutting
A process involving a superheated, ionised compressed air stream to cut metal sheet and plate, either as a hand-held torch or a computer controlled machine. Often used for computer controlled profile-cutting.

Plummer block
The static, semi-circular grooved block, forming part of a Journal bearing, which see above. See also Journal bearing.

Pop rivet
‘Pop’ or ‘blind’ rivets are small hollow rivets, fitted into holes, to make joints in sheet metal structures. They are designed to be applied from one side only and are set with a tool which press on an internal metal mandrel, upsetting the end of the rivet and snapping off at a prearranged load.

Power hammer
A hand or foot controlled machine, which provides a controlled blow between a hammer head and
an anvil, enabling large sections of hot metal to be forged. Power hammers were originally powered by a water wheel, then by steam, and finally by electric motors. Power hammers are rated by the weight of the hammer head, which may range from a few kilograms to tonnes.

Press A press provides pressure, rather than impact, enabling metal to be bent, punched and formed. Fly presses do this using hand power; which allows the operator to 'feel' the movement of the workpiece. Hydraulic presses are power tools, which lack 'feel' but produce a far greater pressure.

Preventive conservation Measures and actions aimed at avoiding and minimizing future deterioration or loss. These measures are indirect, do not interfere with the materials and structure of the item, and do not modify its appearance. Examples include: registration, handling, housing, security, and environmental control. See also Remedial conservation.

Pritchel The narrow square section tapered punch used by farriers to punch holes in horse shoes, to fit a horseshoe nail.

Pritchel hole The small, round hole usually through the end of the face of an anvil, used by farriers for punching holes.

Profile-cutting Cutting a particular shape from sheet or plate, either by band-sawing, oxyacetylene cutting, laser or plasma cutting. Much profile cutting is now computer controlled.

Puddled iron Wrought iron produced using a coal or oil fired reverberatory furnace. This was the malleable iron used throughout the nineteenth century and was progressively replaced by mild steel after about 1870. See Wrought iron.

Punch A hardened steel tool, driven by a hand or sledge hammer, used to make holes or imprint patterns or lettering in hot metal. A punch may be directly hand-held or fitted with a handle; both are used on an anvil.

Punching The act of using a blacksmithing holes, punches are hot, essentially displacing metal, rather than removing it. Usually a hole is punched, then refined in form using a ‘drift’ driven right through the hot metal. See Drift.

Pure iron High purity iron, often used for its electrical and magnetic properties. Softer and more easily worked, hot or cold, than mild steel or wrought iron.

Quatrefoil A traditional four-lobe decorative form.

Quenching Rapidly chilling hot metal in oil or water; often to harden carbon steels. Water chills metal quicker than oil. Iron and mild steel may be quenched for convenience to chill metal as necessary, but steels with more carbon will be hardened if quenched from red heat, and can subsequently crack if not tempered. See Temper.

Rag or Ragging A pattern of cuts or projections forged in a metal bar to be set into masonry, as an anchor or fixing. The indentations serve to lock it into the masonry material to prevent withdrawal.

Rag bolt A bolt with its shank forged with hollows and projections, designed to be grouted in.

Rail A horizontal structural bar in a gate, railing or other panel.

Railing A barrier, designed to guard an area or change in level, consisting of panels between posts, often referred to as a ‘fence’ or ‘railing’.

Raising Forming sheet metal into a three-dimensional shape by hammering over the anvil or other tool.

Rasp A coarse file, sometimes used on hot metal.

Reamer A fluted hand tool to enlarge and refine a hole to an accurate size or shape.

Red hot See Hot.

Remedial conservation Actions applied to an item, aimed at arresting current damaging processes, or reinforcing its structure. Such actions are indirect, do not interfere with the materials and structure of the item, and do not modify its significance or function through past alteration or deterioration. Examples include reassembling a broken structure, straightening damage, or replacing missing components.

Reveal The side of an opening in a masonry wall such as that for a window or door.

RHS Rolled hollow section. Round, square or rectangular tube formed by rolling.

Ring A bar bent in a circle.

Rise The vertical height from the nosing of one step of a stair to the next.

Riser The upright part of a step.

Rivet A metal pin with a shaped head, used to join two or more components. The rivet is inserted, and the head solidly supported, while the plain end is hammered or crushed to form another head. The process is called ‘setting’. Iron and steel rivets are usually set hot; copper or aluminium rivets may be set cold.

Rococo An art historical period and form of decoration originating in France in the early 18th century, characterised by the extensive use of ‘C’ and ‘S’ scrolls, forming the framework from which other decorative motifs emerge.

Rod A thin metal bar. The term lacks a precise definition, but usually applies to a metal bar over 3mm, but less than 20mm in diameter. Sometimes used to mean round bar.

Rodded tools Blacksmithing tools such as swages, chisels or file, set on an iron or steel rod handle. They are driven using a sledge hammer.

Rolled steel joist, usually a heavy structural ‘I’ section.

Rust The corrosion products of iron and steel.

Rust heave, rust jacking A build up of corrosion products resulting in the pushing apart of two or more closely fitted bars of iron or steel.

Sandbag A sand filled leather ‘cushion’ used to support sheet metal form to form or shape it.

Scarf An oblique angle forged or cut at the end of a pair of bars, in preparation for joining them end to end. The scarf increases the area of contact between the two surfaces. Fire welding this overlap allows the blacksmith to use one piece to trap the other for a second, until hammer blows complete the weld.

Scone 1) Hiz: A candleholder on an ornamental bracket attached to a wall. 2) A candleholder with a handle. 3) Sometimes used to indicate the drip pan of a candleholder.

Screen A decorative metalwork panel or grille, indoors or out. The panels of decorative metalwork dividing the fixed panels of metalwork flanking a grand country house gate may be called a ‘screen’ or ‘side screen’. Even longer runs, which might otherwise be described as a ‘fence’ or ‘railing’, may also be referred to as a screen, perhaps because of their elaboration and decorative value. The Tiju Fountain Screen at Hampton Court is an example.

Screw A metal fixing with a threaded shank, and various shapes of head, with various types of slot or socket for a screwdriver or wrench. Metalworking screws are called Machine Screws, Bolts or Self-tapping screws; screws for wood are called Woodscrews, Coach screws or Coach bolts. See also Thread forms.

Screw thread There are many different forms of metalworking screw threads used in Britain, some now historic. For example today, the most commonly used are Metric Fine and Metric Coarse. Historic thread forms include Whitworth, BSF (British Standard Fine) and BA (British Association).

Scriber A sharp pointed hand tool, a stylus for marking out on metals, either hardened steel or carbide tipped.

Scroll A bar formed to a volute or spiral, and a crucial part of the vocabulary of traditional ironwork. There are many different patterns, defined by the scroll ends or ‘hils’. For example: ribbon-end, fish tail, solid snub-end, fish tail snub-end, halfpenny snub end, bolt-end, blown over leaf and bevelled. The overall shape is often described as an ‘S’ scroll or a ‘C’ scroll.
Slamming post; Slam bar
A length of projecting flat bar attached to the front stile of a gate to provide double gates with a
Set (verb)
To indent hot metal by means of a set tool. To set down.
Set hammer
A hammer on a rod or timber shaft, designed to be driven by a sledge hammer, while positioned on the
work by the blacksmith.
Set screw
See Grub screw.
Set square
A gauge for checking right angles.
Set tools
Blacksmithing tools 'set' on a steel rod or timber handle, usually driven by a sledge hammer; for cutting, punching, fullering or swaging metal. These are 'top tools'. See Top and bottom tools.
Shadow bar or plate
Additional flat bars attached slightly proud to rails or stretcher frames, to cast a shadow for visual effect.
Shears
Tools operating like scissors; designed to cut metal sheet or plate. Hand shears cut thin sheet metal. Bench shears are attached to a bench and employ a long blade and handle to provide leverage, enabling thicker metal to be cut. Power shears will cut thicker metal still.
Sheet metal
A sliding latch, used horizontally to secure doors and gates to a post, frame or each other. Drop bolts
Sliding bolt
A tenon of rectangular section destined to fit in a slot (a mortise). A common feature of eighteenth century work.
Spray test
Touching an iron or steel sample against a rotating grinding wheel and examining the sparks provides a means of distinguishing wrought iron from steel, or stainless steel and gives some indication of the carbon content of the steel.
Spear
The spear head provides a decorative motif often used for the heads of railing uprights.
Spiral & helical
The dictionary defines both these terms as:
1) A line in two dimensions, winding round a centre and gradually receding from it, as for example a line on paper.
2) A line winding round a central axis and gradually receding from it in three dimensions, lying on the theoretical surface of a cone or cylinder.
Spring swages or fullers
Swages or fullers aligned in pairs and connected by a spring handle. Often used under a power hammer.
Sprue
The point where the molten metal feeds into a casting mould. This is cut off the solid metal after pouring, as part of the flting process, together with the waste metal contained in the necessary runners, risers, vent holes and pouring holes.
Split pin
See Pin.
'S' Scroll
A unit comprising a pair of scrolls forming a letter 'S'.
Stainless steel
A family of rust resistant steel alloys including nickel and chromium. Some are hardenable, some are not. Those high in chromium and nickel are nonmagnetic.
Stake
A bottom tool used in a hardie hole, swage block or vice to provide support for a workpiece while hammering metal to shape.
Standard
A heavy post or decorative panel to which railing panels are attached.
Stay bar; Stay
See Back stay.
Steam hammer
An early power hammer powered by steam. Invented by James Nasmyth. See Power hammer.
Steel
An alloy of iron and carbon often with other metallic additions such as manganese, chromium, molybdenum, and vanadium. See also Carbon steel.
Step
1) The tread of a stair.
2) A change in level in a forged bar or structure.
Stick-in piece
Hist. A dowel pin. See Pin
Stick welding
See SMAW.
Stile
The vertical framing bars of a gate. The back stile is the heavy, usually square section bar from which the gate is hung. The front stile is the lighter bar carrying the latch.
Stock
A tool to hold a die to cut a screw thread.
Stretcher
Hist. A horizontal bar that supports a gate overthrow, or performs a similar function.
Stretcher frame
Hist. A decorative horizontal frame that stretches from pillar to pillar, or between two side panels to frame a gate, as a stand alone element or as a support for an overthrow or cresting.
Striker
The blacksmith's assistant who uses a sledge hammer as directed by the smith.
String or stringer
The inclined supports to the treads and risers of a stair. The line of the strings determines the geometry of the stair; essential information when making stair balustrades or handrails.
Strip
A narrow, thin, flat metal bar or piece of sheet.
Stud
A screw fixing without a head. Either threaded for its entire length or, with a plain shank, threaded at both ends.
Studding
Continuously threaded rod. Called 'all thread' in America.
Swage
A traditional decorative motif involving flower or other forms, arranged as if hanging in a curve between two points.
Swage block
A large, heavy cast iron block, with various holes and swage profiles in its edges, to hold, swage or support different metal sections. Usually used on a stand, enabling it to be located on edge or lying flat.
Swaging
Using a swage to shape metal.
Sweaty
Descriptive of the appearance of the heated surface of iron when it is ready for forge welding (sweating like a pig). See Pig iron.
Scroll wrench
A hand tool with two projecting 'fingers', used to lever hot metal around a scroll former, or other former; or used freehand, sometimes in pairs to bend a bar.
Section
1) The transverse profile of a bar, angle, hexagonal, square, round, flat etc.
2) A drawing showing a view cut through an object or assembly.
Self-tapping screws
Hardened steel metalworking screws, often with a tapered end. Used to join sheet metal assemblies, to tap their own thread in thicker, softer metals.
Set screw
Hist. See S. Scroll.
Shuttering; Shuttering together
See Fire welding.
Shop
Colloquially a workshop.
Side panel
A decorative narrow vertical panel between a gate and a masonry pillar.
Side set
A blacksmithing tool set on a timber or steel rod handle, driven by a sledge hammer. It has a thick blade with an angled end face, used to create and refine the shoulder of a tenon or other change in section.
Silver solder
See Solder.
Slag
Silica impurities developed during the smelting of iron. In wrought iron the slag is mixed in with the iron and forms a vital component of the finished metal. Slag is not present in cast iron, mild steel and pure iron.
Slamming post; Slam bar
A length of projecting flat bar attached to the front stile of a gate to provide double gates with a stop. Hist. See Clipper bar.
Sliding bolt
A sliding latch, used horizontally to secure doors and gates to a post, frame or each other. Drop bolts operate vertically to secure doors and gates by shooting into the ground to secure them in an open or closed position. Sliding bolts may also operate upwards.
Slot tenon
A tenon of rectangular section destined to fit in a slot (a mortise). A common feature of eighteenth century work.
SMAW
Shielded Metal Arc Welding, also called Manual Metal Arc or Stick welding, employs a short, chemically coated metal rod or 'stick'. The electric arc is struck at the end of the stick, melting the flux coating which forms a shield over the weld, excluding atmospheric oxygen. The oldest form of arc welding and still widely used. It is effective out of doors where wind degrades the gas shield of MIG and TIG welding.
Smith
A person who works metal. Often used as short for 'blacksmith'.
Smithy
A blacksmith's workshop. A term often perhaps falling out of use, though sometimes erroneously used in place of 'smith'.
Snaizing iron
Essentially a silver or coppersmith's tool, a shaped head on a long springy steel shaft, enabling it to reach inside a deep vessel or form, to hammer it from the inside.
Snips
See Shears.
Suffice
The underside of an arch, or the eaves of a building.
Solder, soldering
Joining metal components using an alloy of a lower melting point, and an appropriate flux. Traditional tin/lead 'soft' solders use an alloy, melting between 180°C - 270°C, now largely replaced, by tin/silver/copper alloys to avoid lead contamination. Hard solders are copper or silver based, with working temperatures from 600°C - 700°C.
Spacer
Short, sometimes tubular components used between parts of a structure, or between for example a grille and a wall, to create a space between.
Swing (noun) The line described by the opening of a gate, door or window.

Table 1) The small horizontal surface between the face and back of a London pattern anvil. See Anvil.
2) Horizontal ‘steps’ leading to the central cresting of an overthrow.

Tap A tool for cutting internal screw threads in a drilled hole. A particular tap or die is required to make each size and form of screw thread.

Tapering Reducing the section of a metal bar over a length. Also called ‘drawing down’.

Taper pin See Pin.

Tapping Using a tap to cut a screw thread in a hole. A tapped hole is one with an internal thread.

Temper colours Different ‘interference colours’ are produced on bright iron or steel surfaces, relating to temperatures, ranging between 175° and 350°C. They provide a workshop method of judging particular temperatures, necessary to ‘temper’ steel – that is to reduce the brittle quality of hardened steel to the required combination of hardness and toughness.

Tempering The process of heat-treating steel to a particular temperature, as described above.

Template Usually a flat profile piece of sheet metal, used as gauge to enable a particular shape to be set out or checked.

Tenon A round or rectangular ‘tongue’ projecting from a shoulder, usually on the end of a bar to fit a corresponding mortise, to achieve a joint. See also Mortise.

Thread The helical groove cut in a nut or bolt. There are numerous standard thread forms. See Top and Die.

Thunder and lightning Colloquial term for a series of alternating straight and wavy vertical bars.

Tie rod A rod passing through a structure under tension, either diagonally or from one side to another, to stabilize the structure. Also used to restrain bulging or unstable masonry in buildings, often featuring decorative ‘S’ or ‘X’ shaped end plates.

TIG welding Tungsten Inert Gas welding. A form of arc welding employing a nonconsumable tungsten electrode operating under an inert gas shield. Since the arc functions like a flame, joints may be achieved by fusion alone or by using a filler rod, which the operator manipulates in the other hand. The filler metal is of the same chemical composition as the metal being joined.

Tinplate Not sheet tin, but thin sheet steel coated on both sides with tin, to provide safe contact with foodstuffs and general corrosion protection.

Tin snips Not specifically designed to cut tin, but to cut thin metal like tinplate. See Shears.

Tongs Blacksmithing tools with two identical, long handled components pivoted together to grip workpieces, used to hold and manipulate hot metal. There are many types identified by their purpose and jaw shapes.

Top box and Bottom box Used in the sand casting of metals. Metal frames, within which a sand mould is made. Located together by pins and also known as the cope and drag.

Top and bottom tools Matched pairs of tools for diverse purposes, the bottom tool has a shank to fit the handle hole of the anvil, the top tool is hand held by a timber or steel rod handle and is usually driven with a sledge hammer. Also called ‘Anvil tools’. See also Swage.

Tracer A small punch used in repousse work to outline a form.

Transom The horizontal bar over the top of a gate, supporting an overthrow; a horizontal bar dividing windows, or elements of a decorative screen; or the bar between a door and a side-light above.

Transom panel See Stretcher frame.

Trefoil A traditional three-lobed, decorative form.

Tread The flat, standing surface of a stair. A step.

Turret post Hist. See Perp.

Tuvere The nozzle through which the air blast enters a forge hearth.

Turned; Turning See Lathe.

Twist A self-explanatory term. For decorative reasons, iron and steel bars can be twisted when hot, using a twisting wrench designed for the particular section. See also Water twist.

Upsetting A technique for locally thickening a bar by driving metal along its axis, either by hammering, or ramming the bar down on to the face of the anvil. Also called ‘jumping up’. The metal is heated locally to determine where the thickening will occur.

Vane See Weather Vane.

Veining tool A special top and bottom tool to crease lines in sheet metal ‘leaf’ forms, to represent the veins.

Vernier calliper A precision tool for measuring internal or external dimensions and depths.

Vice American ‘vice’. A device to hold a workpiece securely, usually having two jaws operated by a screw. See also Bench vice, Leg vice, Machine vice.

Washer A usually round, flat, sheet metal ring, with a hole to fit a particular size of screw, used to spread the load, protect the surface underneath and assist the tightening of a nut or bolt.

Water leaf A long leaf with a curled tip and gently waved edges, similar to a Hart’s Tongue fern. The base of this traditional, decorative motif wraps around the bar to which it is attached, and is fire-welded in place.

Water twist Or reverse twist. A twist with segments rotated in alternate directions.

Wattle-work Hist. Inter-weaving of iron bar; horizontally and vertically, usually encased in an iron frame. Similar to a grille but different in construction. More evident in Europe; examples in England are rare.

Weather vane or Windvane A decorative metal arm mounted on a pivot to turn easily in the wind, indicating its direction usually with the cardinal points of the compass. See also Weather-cock.

Weather-cock A weather vane in the shape of a cockerel.

Web A thin metal plate or strip, for example connecting the upper and lower flanges of a rolled steel joint.

Welding The process of joining metals by fusion, either using heat to melt and fuse two pieces directly together, or by melting the parent metal and introducing metal from a filler rod of the same metal to achieve a joint. The defining characteristic of welding is that the joint is precisely the same metal as the components joined. Compare Soldering. See also Fire welding, MIG, SAW, and TIG.

Wet and dry paper Abrasive paper capable of being used both wet and dry.

Winders The triangular or tapering star treads necessary to carry a staircase around a corner.

Wire Very slender metal rod, up to around 3mm diameter, often flexible.

Woodscrew Screws for securing wood, with various types of head and thread forms, and a pointed end. A length under the head is often not threaded.

Work-hardening The effect of hammering, twisting, rolling or bending metal cold, is to harden it. This may be useful to increase rigidity but taken too far can cause the metal to fatigue and crack. Work-hardening is removed by annealing. See Anneal.

Wrapped joint A joint created by winding a heated bar several turns around a cold bar or bars. As it cools the hot bar contracts, gripping the bar or bars underneath holding them together. The wrapping bar is usually smaller in section, and heated using a gas torch, as it is applied.

Well The gap between one flight and the next, where the stairs turns through 180°.

Wrought iron The traditional blacksmithing metal. A malleable iron containing a mixture of iron and fibres of glass-like slag, resulting from the forge welding of a ‘bloom’ of iron and slag at a high temperature but below the melting point. Wrought is the Middle English word meaning ‘worked’. See also Charcoal iron and puddled iron.

Wrought ironwork Not necessarily work made from wrought iron metal. This today is a loose and ambiguous term, widely used to describe any hot forged, decorative metalwork made either in mild steel or wrought iron. See Wld steel and Wrought iron.

Zinc A soft metal, usually alloyed with copper; aluminium and magnesium, for structural purposes as small de-castings. The metal is widely used for roofing sheets and galvanising. See Galvovising.

Zinc rich paint A paint containing finely powdered zinc metal, applied to bare iron and steel surfaces as a primer and a good protection against corrosion.

Zinc spraying An anti-corrosion treatment for iron and steel, which may be achieved on site, or undertaken as a service in special workshops. The metalwork is grit-blasted to remove forge scale, paint or other contaminants, and molten zinc is sprayed by hand to adhere mechanically to the surface. It offers excellent corrosion protection, but cannot coat internal surfaces and crevices. The granular surface will take paint, but is better after etch priming. See also Galvonic corrosion, and Galvovising.