A Glossary of Flaws and Features Found in Handmade Paper

Arranged by the Materials, Tools, and Operations of Traditional Hand Papermaking

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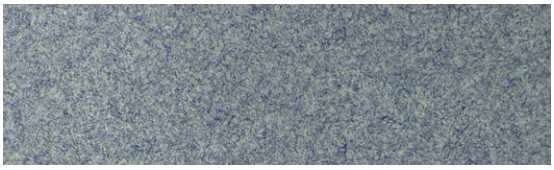
I. Rag Preparation & Beating

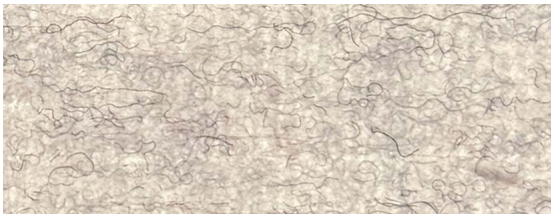
Brown or gray paper (papier gris)
Paper made from darker, lower-grade, or poorly processed rags, often coarser and containing knots or other inclusions. Dark coloration could also result when damp rags were fermented [retted] too long, developing black mold that could darken the finished paper and weaken the fibers.

Colored paper: dyed-rag furnish
Fibers retain their individual colors after beating, producing a mottled or filamentary appearance rather than completely uniform color.

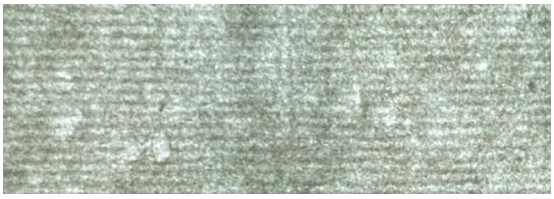


Colored paper: pigment in the beater
Finely ground pigment disperses throughout the stuff, generally producing a flat, relatively uniform color.

Fibrous non-cellulose inclusions
Wool, silk, nylon, or other non-cellulose fibers appear as visible strands. They may be accidental contaminants, decorative additions, security features, or functional ingredients.



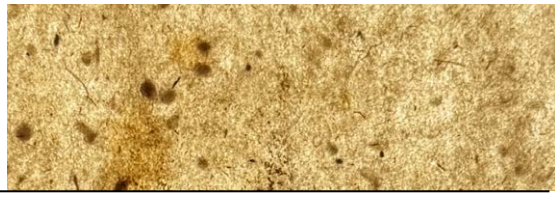
Froth or foam spot, bell, bubble mark
(aka bubble rings) Protein, gelatin, or other contaminants stabilize foam in the vat. Surviving bubbles displace fibers and leave circular, ringed, or crater-like marks.



Inclusions from incompletely dispersed recycled paper: Dense fragments or nodules formed when recycled sheets, scraps, or sized "hard broke" are not completely softened and dispersed.

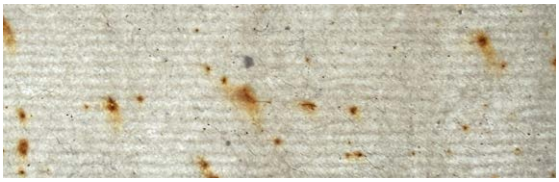
Reading note. The boundary between a flaw and a feature depends on context. Qualities once rejected as manufacturing defects may now be valued as evidence of materials, tools, technique, and historical use.

Knots (fiber bundles)
Tangled clumps of insufficiently broken down and dispersed rag fibers. They indicate poor sorting, uneven retting, inadequate beating, or incomplete clearing in the Hollander beater.



Optical brighteners
Modern fluorescent additives in rags or paper that create an unnaturally bright blue-white appearance under ultraviolet light. Their presence can reveal modern fiber contamination.

Specks
Small visible foreign particles identified according to the material from which they originated. (bronze, button, carbon or cinder, iron, rosin, rubber, size, wood, etc.)

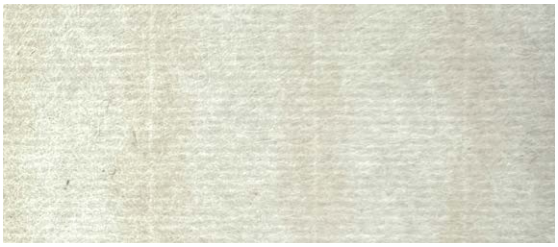


Shives
Small, dark, splinter-like pieces of woody plant core left by incomplete retting, cooking, scutching, or beating of flax and hemp. They can also be introduced by splintering stamper hammers or by rotting wood between a beater's fly-bars.

Waterleaf paper
Paper that has been formed, pressed, and dried but not sized. Because it is highly absorbent, water-based ink can spread or bleed when applied to its surface.

II. Mould & Deckle Features

Antique laid paper
Paper formed on a mould whose laid covering consists of closely spaced laid wires held together by more widely spaced chain wires. The covering is sewn directly onto the ribs of the mould, producing shadows on either side of the chain lines in the finished sheet.



Broken or wavy chain and laid lines
Kinks, gaps, or displaced lines record physical damage to the mould's wire covering.

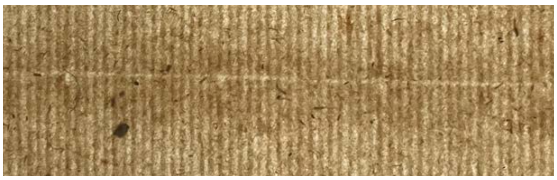
Deckle edge
The naturally feathered perimeter formed where pulp meets the removable deckle. Historically trimmed, it is now often prized as a feature.

Laid paper from a worn or damaged mould
Loose, bent, broken, or repaired wires produce distorted, interrupted, missing and unusually irregular laid and chain lines.

Light-and-shade watermark
An embossed wove screen produces graduated paper thickness, allowing tonal, three-dimensional images rather than simple line designs.

Modern laid paper
Made with a two-layer mould covering that separates the laid surface from the wooden ribs. Its pattern is more regular and shows no rib shadowing unlike antique laid paper.

Visible chain-line tie-downs
Small interruptions or nodes where the wire surface was fastened to the ribs of the mould. These appear as repeated details along chain lines.



Wild deckle, feathered, rebordée, or dentelée
An unusually irregular edge caused by poor mould/deckle fit, uneven drainage, or lifting the deckle before the sheet has stabilized.

Wire gauge and spacing
The thickness and interval of laid wires determine to some extent the scale and strength of the visible pattern and can help characterize a mould or period.

Wire watermark
A raised wire design attached to the mould displaces pulp, creating a thinner, lighter image visible in transmitted light.

Wove paper
Paper formed on a mould with a fine woven-mesh covering separated from the ribs by a coarser secondary mesh, which prevents rib shadows. The finished sheet has a comparatively uniform look-through, without a pronounced laid-and-chain-line pattern.

III. Sheet Formation

Clogged-mould drainage shadow: Pulp lodged between the forming wires and the underlying support-wire grid impedes drainage during sheet formation, producing thinner, lighter areas that reproduce the pattern of the supporting wires in transmitted light.

Cloudy sheet

Uneven light-and-dark formation caused by an imperfect dip, poorly timed or insufficient shaking, premature drainage, or inadequately prepared pulp.

Cumuli-pattern felt-side tidal disruptions

A flowing pattern of felt-side disruption caused by a depression in the post, such as one resulting from misaligned felts, combined with a wet stuff and excessive couching pressure. It creates irregular, tide-like boundaries, with displaced fiber accumulating along one side.

Holes made and filled by the vatman

When a knot, shive, or other inclusion is picked out from the wet sheet, it may leave a hole in the fiber mat. The vatman may scoop a small amount of stuff from the vat and drip it into the void to fill the opening, leaving a visible patch of different thickness, texture, or fiber distribution.

Sloughed sheet during draining

A still-fluid fiber mat slides, wrinkles, or breaks apart when an insufficiently drained sheet on mould is tilted too steeply or handled too soon.

Strong surface laid pattern

A pronounced wire texture produced by the structure of the mould covering, a free stuff with fibers of moderate but not excessive length, a two-sided felt with a short nap on one side and a long nap on the other, and spur or unconstrained drying.

Thin edge from a clogged screen

Fibers lodged in the leading portion of the mould impede drainage, leaving a lighter, thinner band on the sheet's "*bad side*" (mauvaise rive).

Thin perimeter from premature deckle removal

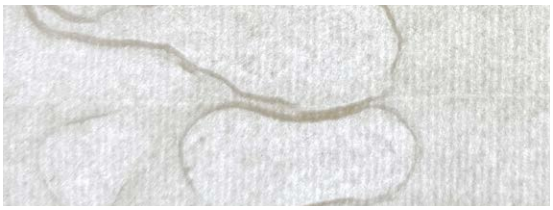
Wet stuff escapes beneath or beyond the deckle as it is lifted, producing a thin border and frequently a wild deckle.

Vatman's drip marks (aka tear or gouttes d'eau)
Crater-like marks made when drops fall from the vatman or deckle onto the felt side of a newly formed sheet. The laid pattern remains visible inside the disturbance. *See also Coucher's drip marks*

Wild formation
Severe mottling, crazing, fiber upheaval, or uneven distribution caused by erratic dipping, forceful shaking, under-processed rags or long fibers in the stuff, splashing, or other major disturbances during sheet formation.

IV. Couching Flaws & Felt Impressions

Air bubbles, blisters (musettes)
Air trapped between a felt and a newly couched sheet can create raised bubbles in the sheet. When pressed, the bubbles leave circular thin areas with thickened margins. Puncturing them may leave light-and-shade fingerprints.



Coucher's drip marks (aka tear or drop)
Water drops falling after couching strike the exposed wire side of the sheet, creating craters in which the laid pattern is disrupted or absent.

Crush marks (écrasé)
Excessive couching pressure on a very wet, heavy, or slow-draining sheet forces water laterally through the fiber mat, producing long, mottled, stretch-mark-like scars. Often found on the "bad side" of the sheet.

Deckle remnants
Dried fiber fragments from an earlier sheet left on the felt may transfer to a subsequent sheet, or wet pulp trapped beneath a poorly fitted deckle may fall onto the sheet when the deckle is removed.

Dragged felt
Dragging or repositioning a felt across a newly couched sheet shears the wet fiber mat, often rolling its far edge into an arcing ridge.

Thick edge

Far edge folded back during couching.

Uneven pressure allows part of the sheet to cling momentarily to the mould and then fold over itself, producing a doubled edge.

Felt hair marks and embedded hairs

Guard hairs in mixed hair-and-wool felts, made from the fleece of hair sheep, may leave grooves or impressions in the paper's surface or become embedded in it.

Lost corner when couching

An over-drained sheet or insufficient couching pressure prevents a corner or edge from transferring from mould to felt; it may tear away or be awkwardly reattached.

Sewn or mended felt marks

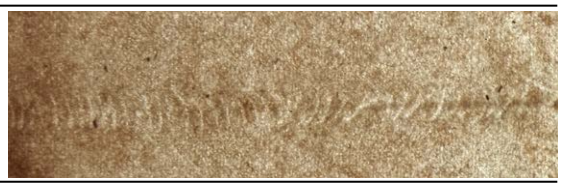
Heavy stitches and patched areas in repaired felts emboss diagonal ridges or other localized patterns into the paper.

Slurred chain lines

Sliding or twisting the mould during couching drags the wet fiber network and smears the chain-line pattern.

Stitch watermark or machine-seam mark

A band of stitch impressions formed at the joined ends of an endless forming wire or a mend on a wove mould.



Top-sheet impact disruption

The edge of a mould striking or resting on the post disturbs the sheet beneath the upper felt, leaving a light-and-dark stripe.

Worn-felt weave marks

As the felt's nap wears away, its woven foundation presses a textile-like grid or "shagreen" texture into the damp sheet.

V. Pressing, Parting & Drying

Back mark
Parallel ridges form where a small group of sheets, known as a spur, is folded or draped during drying, often over a rope, pole, or treble line. The ridges usually run parallel to the chain lines and near the center of the sheet.

Cockling
Irregular waves, puckers, and undulations caused by uneven shrinkage as a sheet dries without sufficient restraint. Differences in fiber distribution, moisture, sizing, or drying rate can make some areas contract more than others.

Diamond-shaped cockling
A large, diamond-shaped pattern of raised and depressed areas created by directional fiber shrinkage and uneven restraint during drying. The pattern may result from the sheet's edges drying faster than its center and can be influenced by humidity, air movement, support, and the sheet's orientation or arrangement during drying.

Lost or damaged corner
A sheet damaged during couching, parting, or sizing, in which a corner was torn away and, in some cases, subsequently reattached.

Secondary back mark
Additional ridges created when a drying spur is bumped, folded, or displaced from its normal drying position. The ridges may appear at any angle across all or part of a sheet.

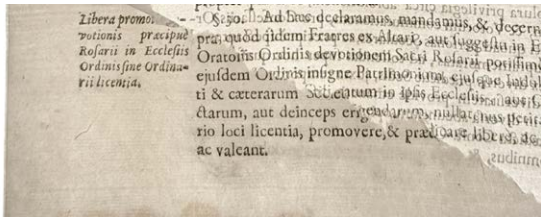
VI. Sizing Flaws & Features

Animal-gelatin sized paper
Sheets that have been immersed in warm animal-skin size. The gelatin strengthens waterleaf paper, reduces absorbency, and helps prevent water-based ink from feathering.

Crumpling or crimping while wet with size
Mechanical damage breaks or compresses fibers while the sheet is gelatin-wet. The disrupted lines absorb more size and dry as translucent creases.

Crystals or shiny size spots ("sugaring")
Gelatin or associated materials crystallize or concentrate on the surface, leaving sparkling, glossy, or translucent spots.

Glued corner
A sized sheet folds or touches itself while wet with size; the gelatin bonds the contacting surfaces, leaving a permanently doubled and adhered corner or edge.



Internal or engine sizing
Size is added directly to the stuff rather than applied by dipping the finished waterleaf sheet. Modern examples include starch and alkali-compatible synthetic sizes.

Over- or under-sizing
Excess gelatin size can make paper stiff, glossy, uneven, or stuck together; insufficient size leaves it weak, absorbent, and prone to ink bleeding.

Size stain and Size concentrated at the edge
Size may migrate as a wet sheet dries, forming a darker tide-line stain or accumulating toward the perimeter and creating a darker, harder, glossier, or more translucent border.

VII. Glazing, Burnishing

Burnished ruling ridge
A cord or wire placed beneath a sheet during burnishing creates a shallow raised line that can serve as a writing-margin guide.

Burnishing or glazing marks
Polished stone, wood, trip hammers, or glazing rolls compress the surface and can create glossy marks or directional streaks and variations in raking light.

Glazing-roll finish
Wooden and metal rollers mechanically consolidate and smooth paper, creating a more uniform, closed surface than hand burnishing.

Appendix A

Glossary of Papermaking Terms

Air-dried: Paper dried by exposure to air rather than by direct contact with heated cylinders. The air may be still or circulated naturally or mechanically and may be heated. Individual sheets generally dry unconstrained, while sheets dried together in spurs constrain one another. See also *Back mark*, *Cockling*, *Diamond-shaped cockling*, and *Secondary back mark* under V. Pressing, Parting & Drying.

Alum: A mineral salt added to animal-gelatin size to help regulate and fix the sizing. The kind, proportion, and acidity of the alum affect the hardness, absorbency, and long-term stability of the sized paper. See *Size, Size stain, and Sizing* in this appendix and the entries under VI. Sizing Flaws & Features.

Ass, Asp, or Horn: A curved wooden support at the corner of the vat where the coucher rests the mould while it drains. See Appendix C.

Bad side (Fr. mauvaise rive): The lower half of a traditional hand mould or sheet, often thinner because this area of the mould covering clogs more readily. See also *Thin edge from a clogged screen* under III. Sheet Formation.

Beater or Hollander beater: A machine in which rags, fibers, or partially prepared pulp circulate through water and pass between a rotating barred roll and a stationary bedplate. The action separates, cuts, fibrillates, and hydrates the fibers. The Hollander gradually replaced the earlier stamper. See also *Knots (fiber bundles)*, *Shives*, and *Wild formation* under I. Rag Preparation & Beating and III. Sheet Formation.

Beating: The mechanical processing of fibrous raw material in water to separate, shorten, fibrillate, and hydrate the fibers until they form a usable papermaking pulp. The manner and duration of beating affect drainage, formation, shrinkage, opacity, strength, and surface character. See also *Brown or gray paper (papier gris)*, *Knots (fiber bundles)*, *Shives*, and *Wild formation*.

Bon Carron: A French papermaking technique in which the mould is tipped toward one corner after sheet formation, causing additional fiber to collect there and strengthen the corner for handling by the parter or layer.

Bridge: A platform across the vat along which the coucher returns the empty mould to the vatman. See Appendix C.

Broke or hard broke: Broke is flawed, rejected, trimmed, or surplus paper returned to the papermaking process for repulping. Hard broke is paper that has already been dried, sized, or otherwise consolidated and is therefore more difficult to soften and disperse. See also *Inclusions from incompletely dispersed recycled paper* under I. Rag Preparation & Beating.

Burnishing: Smoothing and polishing the surface of paper by rubbing it with a hard, smooth tool, such as a stone, glass, or metal burnisher. See also *Burnished ruling ridge* and *Burnishing or glazing marks* under VII. Glazing, Burnishing.

Cassie: The often-damaged outside quires of a ream of good handmade paper.

Cellulose fiber: A plant-derived fiber whose cellulose molecules allow adjacent fibers to bond as a sheet forms, is pressed, and dries. Linen, hemp, cotton, and wood are common sources of cellulose fiber used in Western papermaking.

Chain line, laid line, and wire line: Laid lines are the fine, closely spaced parallel lines produced by the laid wires of a papermaking mould. Chain lines are the more widely spaced lines crossing the laid lines and generally aligned with the mould's ribs and chain-wire attachments. *Wire lines* is a collective term that may include both laid and chain lines. See also *Broken or wavy chain and laid lines*, *Laid paper from a worn or damaged mould*, *Slurred chain lines*, *Visible chain-line tie-downs*, and *Wire gauge and spacing*.

Cockling: Irregular waves, puckers, or undulations caused by uneven expansion and shrinkage as paper dries or responds to changes in moisture. Differences in fiber distribution, sizing, sheet thickness, restraint, airflow, and drying rate can make some areas contract more than others. See also *Cockling* and *Diamond-shaped cockling* under V. Pressing, Parting & Drying.

Constrained-dried: Paper dried while shrinkage and movement are restricted. Examples include handmade sheets dried together in spurs and machine-made paper dried on heated cylinders, dried flat under pressure in a stack dryer, or dried adhered to wood or glass. See also *Cockling* and *Diamond-shaped cockling*

Coucher: The worker who transfers each newly formed sheet from the mould onto a felt.

Couch stool: A support in front of the coucher against which a lifted felt falls so that it spreads out flat before being pitched onto the post. It could also support the pilcher while a pressed post was being taken apart.

Couching: Transferring a newly formed wet sheet from the papermaking mould onto a felt. See also the entries under IV. Couching Flaws & Felt Impressions.

Crocking: The transfer or removal of loosely bound dye, pigment, or other coloring matter when the paper's surface is rubbed or abraded. Crocking may indicate that a colorant was poorly fixed to the fibers or remains loose on the sheet's surface. It is unrelated to cockling.

Cross or T: A T-shaped wooden tool used by the dry worker to lift spurs of paper from the pack and carry or hang them on the treble lines in the drying loft. The length of the handle varied with the height of the treble lines. A similar tool, known as a peel, was formerly used by printers to hang printed sheets for drying. See also *Treble line.*

Crosses: */, B, B XX, or XXX*: (aka **grade marks) marks placed on wrappers or ream edges to identify defective or lower-grade paper.

Curl: A tendency of paper to curve or roll, caused by unequal shrinkage between the two sides of the sheet as humidity changes. The curl results from differences between the felt and wire sides and, in rough handmade paper, is generally toward the wire side.

Deckle: The removable frame fitted around a mould to contain the pulp and determine the sheet's size and edges. See also *Deckle edge*, *Thin perimeter from premature deckle removal*, and *Wild deckle, feathered, rebordée, or dentelée*. See Appendix B, *Antique Laid Paper Mould*, and Appendix C, *The Vatman's Workstation*.

Deckle slip: An adjustable wooden strip fastened beneath the deckle so that it fits closely against the side of the mould and prevents stuff from passing under the deckle. The slip requires periodic adjustment as the mould and deckle wear.

Dewatering: Removing water from pulp or a wet sheet through drainage, suction, pressing, and drying.

Drip line or drip rib: One of the smaller outermost ribs of a traditional papermaking mould, positioned outside the principal ribs. Drip ribs support the margins of the mould covering and may affect drainage. See Appendix B, *Antique Laid Paper Mould*.

Drying loft: A large, well-ventilated room, usually in an upper story of the paper mill, where sheets or spurs were hung from treble lines to dry. Adjustable shutters or louvres regulated airflow, temperature, and humidity. Drying conditions in the loft influenced the rate and uniformity of shrinkage and therefore the degree of cockling. Contact with treble lines could produce back marks. See **Air-dried, Constrained-dried, Spur, and Treble line** in this appendix; see also *Back mark*, *Cockling*, *Diamond-shaped cockling*, and *Secondary back mark* under V. Pressing, Parting & Drying.

Dryworker: A worker responsible for operations following sheet formation and the first pressing, particularly handling and pressing packs, loft drying, and moving paper between later processes.

Felt or papermaking felt: A textile, traditionally made from wool or a mixture of wool and hair, placed between wet sheets during couching and pressing. The felt supports the fragile sheet, absorbs water, and can impart its surface texture to the paper. The raised surface of a felt is called its *nap*. See also *Felt hair marks and embedded hairs*, *Sewn or mended felt marks*, and *Worn-felt weave marks* under IV. Couching Flaws & Felt Impressions.

Felt board: A board beside the coucher on which papermaking felts are stacked before couching and onto which the felts may be placed as a pressed post is taken apart.

Felt side: The side of a sheet that contacts the felt during couching, opposite the wire side.

Finisher: The worker who counts finished sheets into quires, arranges them so that the watermarks are consistently oriented, and wraps and marks the completed reams.

Formation: The manner in which fibers are distributed, disposed, and intermingled within a sheet of paper. Formation is often judged by examining the evenness of the sheet's look-through in transmitted light. See also *Cloudy sheet* and *Wild formation* under III. Sheet Formation.

Free or fast stuff; wet or slow stuff; freeness: Free or fast stuff parts readily with water and drains quickly through the mould. Wet or slow stuff retains water and drains more slowly, usually because the fibers have become more hydrated and fibrillated during beating. *Freeness* describes this drainage behavior. See also *Sloughed sheet during draining* and *Strong surface laid pattern* under III. Sheet Formation.

Fur: Stuff that accumulates beneath the deckle, in the face of the mould, or on a felt during repeated sheet formation and couching. If it transfers to a subsequent sheet, it can produce a thick, thin, or irregular area.

Furnish: The fibers and other materials, in specified proportions, from which a particular paper is made—effectively, its recipe. In modern machine papermaking, furnish may also refer to the prepared stock supplied to a paper machine's headbox.

Glazing: A finishing process that smooths and compacts the surface of paper by pressure or friction, often after sizing, producing a smoother and sometimes more lustrous surface. See also the entries under VII. Glazing, Burnishing.

Good side (Fr. bonne rive)**:** The upper half of a traditional hand mould or the corresponding half of the finished sheet, opposite the bad side. It generally drains more readily and is less likely to develop the thin band associated with clogging on the bad side. See *Bad side* in this appendix.

Grain direction: The predominant alignment of fibers in a sheet of paper. In handmade and machine-made paper, this usually follows the direction of water movement during sheet formation. In handmade laid paper, the grain direction is usually parallel to the chain lines.

Grape shot: Compact clumps or accumulations of fiber and string-like material in strong stuff. They could collect on splinters projecting from a wooden hog and might enter the sheet if not removed.

Hair lacings or stitches: In early moulds, the chain wires were frequently fastened with hair. These attachments could leave subtle interruptions or nodes rather than clearly visible continuous chain lines. See also *Visible chain-line tie-downs* under II. Mould & Deckle Features.

Hog: A driven wooden or brass agitator that keeps the stuff circulating in the vat. Wooden hogs could develop splinters on which grape shot collected. See Grape shot in this appendix.

Horse- or cow-hair rope: See **Treble line.**

Knotter or strainer: A screening device, traditionally a vibrating, flat slotted metal plate, through which diluted stuff passes before entering the vat. Properly prepared fibers pass through the slots while knots and other foreign matter, historically called contraries, are retained.

Laid: Paper showing parallel laid lines and wider-spaced chain lines created by a laid-wire mould. See also *Antique laid paper*, *Broken or wavy chain and laid lines*, *Laid paper from a worn or damaged mould*, *Modern laid paper*, and *Strong surface laid pattern*. See Appendix B, *Antique Laid Paper Mould*.

Lay stool: A slightly sloping support that holds the zinc plate and pack felt on which the layer builds a pack after separating the sheets from the vat felts.

Layer: The worker who separates pressed handmade sheets from the felts.

Loft canvas: A coarse jute canvas, traditionally spun without oil, on which sheets or spurs are dried flat in the drying loft. The canvas is stretched and clamped between wooden trebles; an uneven or slack canvas can produce waves in the paper. See *Drying loft* and *Treble* in this appendix.

Look-through and transmitted light: *Look-through* is the structural appearance of a sheet examined with transmitted light. Transmitted light comes from behind the sheet and passes through it, revealing differences in thickness and fiber distribution, as well as laid and chain lines, watermarks, inclusions, patches, and formation flaws. See also *Antique laid paper*, *Cloudy sheet*, *Light-and-shade watermark*, *Modern laid paper*, *Wild formation*, and *Wire watermark*.

Maturing: Allowing dried or sized paper to rest in controlled stacks between operations so that moisture, sizing, and stresses become more evenly distributed and the sheet becomes conditioned for the next process. The stacks may be turned or weighted gradually during the maturing period.

Mould: The principal tool used to form an individual sheet of handmade paper. A Western papermaking mould generally consists of a rectangular wooden frame and ribs supporting a laid or wove wire covering through which water drains. A removable deckle fits over the mould. See also the entries under II. Mould & Deckle Features. See Appendix B, *Antique Laid Paper Mould*, and Appendix C, *The Vatman's Workstation*.

Mould covering: The laid or wove wire screen through which water drains while the paper sheet forms. See Appendix B**.** On a single-faced mould, the laid or wove forming surface rests directly on the wooden ribs, allowing rib shadows to appear in the finished sheet. A double-faced mould has a secondary supporting screen between the forming surface and the ribs, reducing or eliminating rib shadows and producing a more regular look-through. See also *Antique laid paper* and *Modern laid paper* under II. Mould & Deckle Features.

Mould tank: A vat-side tank in which the vatman rinses or dips the mould when fur has collected beneath the deckle or in the mould covering. It must be kept free of slime and debris.

Outsides: Seriously defective sheets with such flaws as a broken surface, torn edges, large iron-mould marks, or wrinkles. Historically, they could be used for the outside quires of a ream and marked XXX. Green distinguishes outsides from retree, which had slighter defects. See *Cassie*, and *Retree* in this appendix.

Pack: A stack of damp handmade sheets assembled after the layer has removed the interleaved vat felts from a pressed post. A pack normally has a pack felt above and below it and may undergo repeated pressing and parting before drying or sizing. A pack is distinct from a post. See *Pack felt, Pack parting, Pack pressing, and Post* in this appendix.

Pack felt: A felt placed above and below a pack of damp paper during handling and pressing. Old vat felts or size felts were often reused for this purpose. Wrinkles, tears, or debris in a pack felt can mark numerous sheets during pressing.

Pack parting: Separating the damp sheets of a pressed pack one by one and transferring them to a fresh plate and felt before they are repressed, dried, or sized. Repeated pressing and parting can refine the grain but also introduce tears, wrinkles, and other flaws.

Pack pressing: Pressing a pack of damp sheets without interleaved felts to remove additional water, compact the paper, and regulate its surface or grain. Insufficient pressure leaves a rougher grain; excessive pressure can make the pack difficult to part and damage the sheets.

Parter: A worker who separates pressed or sized sheets from a wad before they are hung to dry.

Parting: Separating wet, pressed sheets from one another after the felts have been removed and before the sheets are restacked, sized, or hung to dry. Poor handling during parting can tear, fold, or displace corners and edges.

Picking: Examining matured paper sheet by sheet to remove surface defects, straighten folded edges or corners, orient the watermark correctly, and reject badly torn or dirty sheets before glazing and final sorting.

Pilcher: A protective wad of three or four felts sewn together and placed over a completed post before it is drawn into the press. The pilcher is removed when the pressed post is taken apart.

Post: A pile of alternating freshly couched sheets and papermaking felts built up beside the vat. The completed post is pressed before the layer separates the sheets from the felts to form a pack. A post is

distinct from a pack. See *Couching, Pack, Pilcher, and Pressing* in this appendix.

Pressing: Applying mechanical pressure to wet or dry sheets. Wet pressing removes water, consolidates the fiber network, and may transfer felt or surface textures. A first pressing commonly compresses sheets alternated with felts; subsequent pressing may compress the wet sheets without felts as a white post or pack. Dry pressing flattens or finishes sheets after drying. See also *Crush marks*, *Far edge folded back during couching*, *Lost corner*, and *Top-sheet impact disruption*.

Pulp, stock, and half-stuff: *Pulp* is a suspension of separated papermaking fibers in water. *Stock* is a general term for pulp prepared or being prepared for papermaking and may overlap in meaning with *stuff*. *Half-stuff* is fiber that has been partly broken, washed, or beaten but still requires additional processing before it is ready for the vat.

Quire: A counted group of paper sheets. Historically, a quire commonly contained twenty-four sheets; modern commercial practice may use twenty-five sheets. Twenty quires traditionally made a ream.

Rag or rag paper: A rag is a piece of discarded or purpose-made linen, hemp, cotton, or other cloth used as a source of papermaking fiber. Rag paper is paper made wholly or partly from such textile fibers. See also *Brown or gray paper (papier gris)*, *Colored paper: dyed-rag furnish*, and *Knots (fiber bundles)*.

Raking light: Light directed across the surface of a sheet at a shallow angle. It accentuates relief, gloss, texture, cockling, creases, felt impressions, and burnishing or glazing marks. See also *Burnished ruling ridge*, *Burnishing or glazing marks*, *Cockling*, and *Worn-felt weave marks*.

Ream: A counted quantity of paper. A historical ream commonly contained twenty quires of twenty-four sheets, or 480 sheets, although the number varied by place, period, and paper grade. A modern ream generally contains 500 sheets.

Retree: Defective or second-quality handmade sheets rejected or downgraded during sorting.

Retting or fermentation: A preparatory process in which plant stalks, rags, or other fibrous material are kept damp or soaked so that microbial action loosens non-cellulosic material and helps separate the fibers. Insufficient or excessive retting can affect color, fiber strength, beating, and finished-sheet quality. See also *Brown or gray paper (papier gris)*, *Knots (fiber bundles)*, and *Shives*.

Ribs: Thin wooden bars that support the wire covering of a papermaking mould; on a laid mould, they generally lie beneath the chain lines. See Appendix B.

Right and wrong sides: Traditional terms used to distinguish the preferred face of a sheet. In handmade paper, the wire side, the side formed against the mould covering, is generally considered the right side, and the watermark is normally right-reading when viewed from this side. The felt side is the wrong side. In machine-made paper, the convention is generally reversed: the upper or felt side is the right side and the wire side the wrong side.

Rough, NOT, and H.P. (hot-pressed): Three surface classifications for handmade paper. Rough paper is not pressed in the packs; *NOT* paper is pack-pressed but not glazed to a smooth finish; H.P. paper is glazed between zinc plates. Although H.P. means hot-pressed, heat is not necessarily used in modern glazing. See *Glazing and Pack pressing* in this appendix.

Sand trap: A device in the stuff-supply system that collects sand, metallic particles, and other heavy contaminants before the stuff reaches the vat. Traditional copper chutes could contain magnets and removable rubber ladders that were cleaned regularly.

Scutching: Beating, scraping, or otherwise removing the woody core and other non-fibrous matter from retted flax, hemp, or similar plant stalks before the usable fibers are further prepared. Incomplete scutching may leave shives in the pulp. See also *Shives* under I. Rag Preparation & Beating.

Seconds: Sheets classified below first quality because of imperfections.

Shadow or chiaroscuro watermark: A watermark formed by shaping or embossing a wove mould covering so that the finished sheet contains graduated

areas of greater and lesser thickness. When examined in transmitted light, these variations create tonal or three-dimensional imagery. See *Light-and-shade watermark* under II. Mould & Deckle Features.

Shake, side shake, and closing shake: Movements imparted to the mould while the sheet forms. In the side shake, the vatman alternately lifts one hand and then the other to send a wave of stuff across the mould. After the excess stuff is thrown over the deckle, a controlled to-and-fro shake helps close and interlock the sheet. Excessive shaking can produce cloudy, wild, or crushed formation. See Formation and Sheet formation or forming in this appendix; see also Cloudy sheet and Wild formation under III. Sheet Formation.

Sheet formation or forming: Making a sheet by dipping the mould into the vat, lifting a measured layer of stuff, and shaking or otherwise moving the mould while water drains through the covering. The *dip* gathers the stuff; the *shake* distributes and interlocks the fibers. See also *Cloudy sheet*, *Holes made and filled by the vatman*, *Sloughed sheet during draining*, *Vatman's drip marks*, and *Wild formation* under III. Sheet Formation. See Appendix C.

Sidedness: The difference in texture, appearance, or composition between the two sides of a sheet.

Size: A material applied to paper to reduce absorbency, strengthen the sheet or its surface, and improve its performance with ink, paint, printing, or drawing media. Traditional Western handmade papers were commonly sized with animal gelatin or glue.

Size house or sizing room (historically "slaughter house"): A room or separate building in which animal-gelatin size was prepared by boiling skin, hide, hoof, bone, and other animal scraps, and in which waterleaf sheets could be immersed in the warm size. The strong odors commonly led papermakers to place the size house apart from other mill buildings. Separating its heating fires and boilers from stores of combustible rags and paper also reduced risk to the mill. See *Sizing* in this appendix and the entries under Section VI.

Sizing: Treating paper, traditionally with gelatin or animal glue, to reduce absorbency, strengthen the sheet and its surface, and improve its performance for writing, drawing, or printing. *Surface sizing* or *tub sizing* applies size to a previously formed waterleaf sheet. *Internal sizing* or *engine sizing* adds the sizing material to the stuff before sheet formation. See also *Animal-gelatin sized paper*, *Crystals or shiny size spots ("sugaring")*, *Crumpling or crimping while wet with size* in Section VI.

Slice boy: A traditional assistant to the layer when very thin papers were being made. Using a thin wooden strip or slice, the assistant steadied each wet sheet as the layer placed it on the pack.

Sorting: Grading finished sheets according to quality and separating good paper, retree, outsides, and sheets too badly defective for sale. Sorting could also include orienting the sheets and removing slight surface marks. See *Outsides, Retree, and Seconds* in this appendix.

Spur: A group of several sheets dried together as a single wad in a drying loft. See also *Back mark* and *Secondary back mark* under Section V.

Stamper: An early machine for reducing rags to pulp. Sets of heavy wooden hammers repeatedly struck wet rags in troughs or mortars, progressively cutting, brushing, and separating them into fibers. Stampers were gradually supplemented or replaced by Hollander beaters. See also *Beater or Hollander.*

Stay: The platform beside the vat along which the vatman passes the newly formed sheet and mould to the coucher. See Appendix C.

Stuff: The traditional hand-papermaking term for prepared pulp or fiber suspension ready for sheet formation, including the material held in the vat. See Appendix C, *The Vatman's Workstation*.

Stuff chest: A container in which prepared stuff is stored and kept uniformly suspended before being delivered to the vat or papermaking machine.

Thick edge: An abnormally heavy or doubled edge produced when the wet layer of pulp folds or "licks over" onto itself during uneven couching. Accumulated fur from a preceding sheet may also adhere near an edge and create a thick irregularity. See also *Crush marks, Thick edge, Lost corner when couching, Lost or damaged corner, and Top-sheet impact disruption*.

Treble line (originally tribble; also drying line or horse- or cow-hair rope): A rope stretched in the drying loft over which individual sheets or groups of sheets called spurs are hung to dry. Contact with the rope can produce a central ridge known as a back mark. *Trebles* or *tribbles* may also refer to the racks or rows of drying lines. See **Spur, Cross** and **T** in this appendix; see also *Back mark* and *Secondary back mark* under V. Pressing, Parting & Drying.

Twin moulds: A matched pair of papermaking moulds used alternately with a single deckle during the building of a post. When watermarked, each normally bears a closely related twin watermark; where countermarks are used, each mould generally carries its own corresponding countermark.

Unconstrained-dried: Paper dried as individual sheets without pressure, adhesion, or tension restricting their movement, allowing the sheets to shrink, curl, or cockle freely. See also *Cockling* and *Diamond-shaped cockling* under Section V.

Upper end boy: A traditional assistant to the coucher when large or two-sheet moulds and long felts were used. The assistant helped position the felt and applied light pressure to the far, or upper, end of the mould during couching.

Vat: The tank containing the water-and-fiber stuff used to form handmade paper. See Appendix C.

Vatman: The worker who dips and shakes the mould in the vat to form each sheet.

Vatman's knock: Peter Bower's term for a forming flaw caused when the vatman accidentally strikes the near long edge of the mould against the side of the vat, sending a wave of stock inward and leaving a band of excess pulp extending approximately 2–3 in. (5–8 cm) into the sheet.

Vein: A persistent linear mark or ridge in a finished sheet caused when the fragile wet sheet develops a buckle or raised line while it is being lifted from the felt or laid onto the pack. See also the entries under IV. Couching Flaws & Felt Impressions.

Wad: A small group or stack of wet or damp sheets handled together during pressing, parting, sizing, or drying. A group of sheets intentionally dried together may be called a spur.

Waterleaf: Paper that has been formed, pressed, and dried but has not yet been sized. Waterleaf paper is highly absorbent and may be matured before being passed through gelatin size. See *Maturing, Size, and Sizing* in this appendix.

Wedgy: A handmade sheet noticeably thicker at one end or edge than at the opposite end because the stuff was unevenly distributed on the mould.

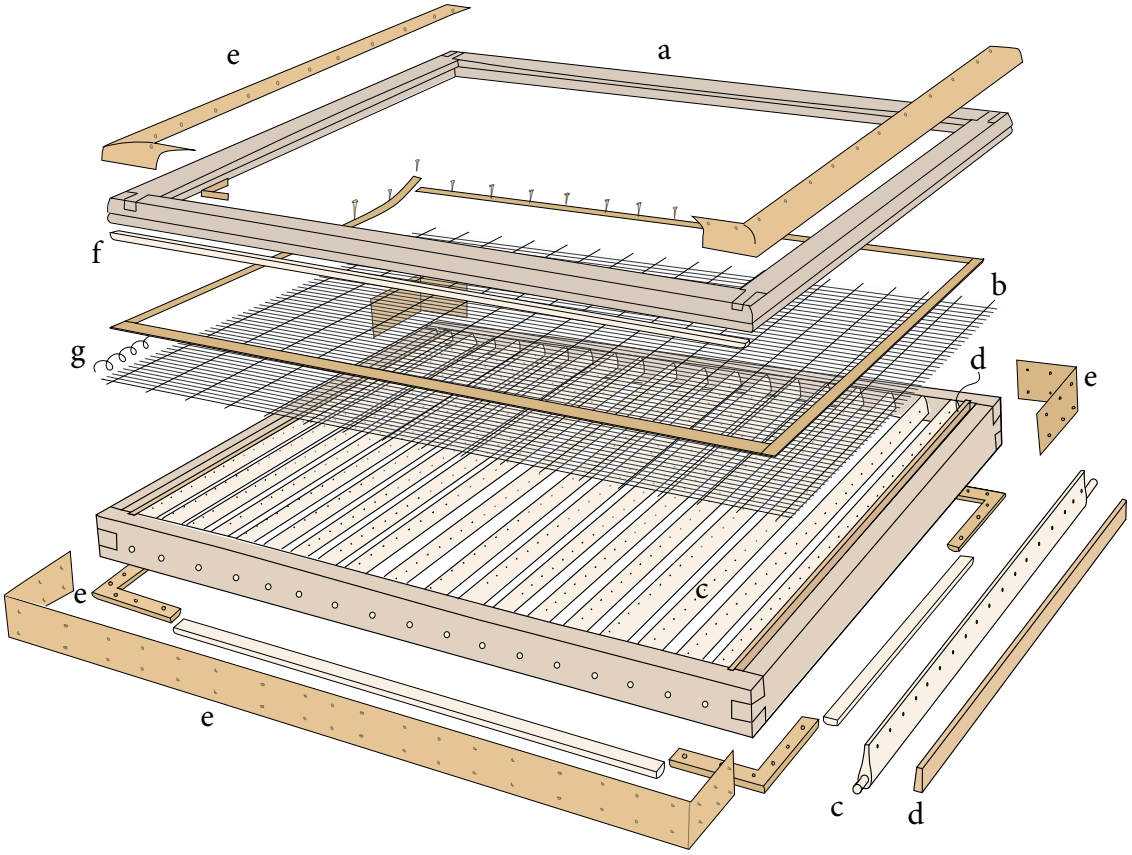
White post or pack: A stack of wet handmade sheets assembled without intervening felts after the first pressing and removal of the felts. The pack is pressed again to remove additional water, consolidate the sheets, and prepare them for parting or drying.

Wire side: The side formed against the mould or machine wire, often showing wire or laid impressions.

Wove: Paper made on a finely woven wire covering, producing an even surface without laid lines. See also *Light-and-shade watermark*, *Modern laid paper*, and *Wove paper* under II. Mould & Deckle Features.

Appendix B

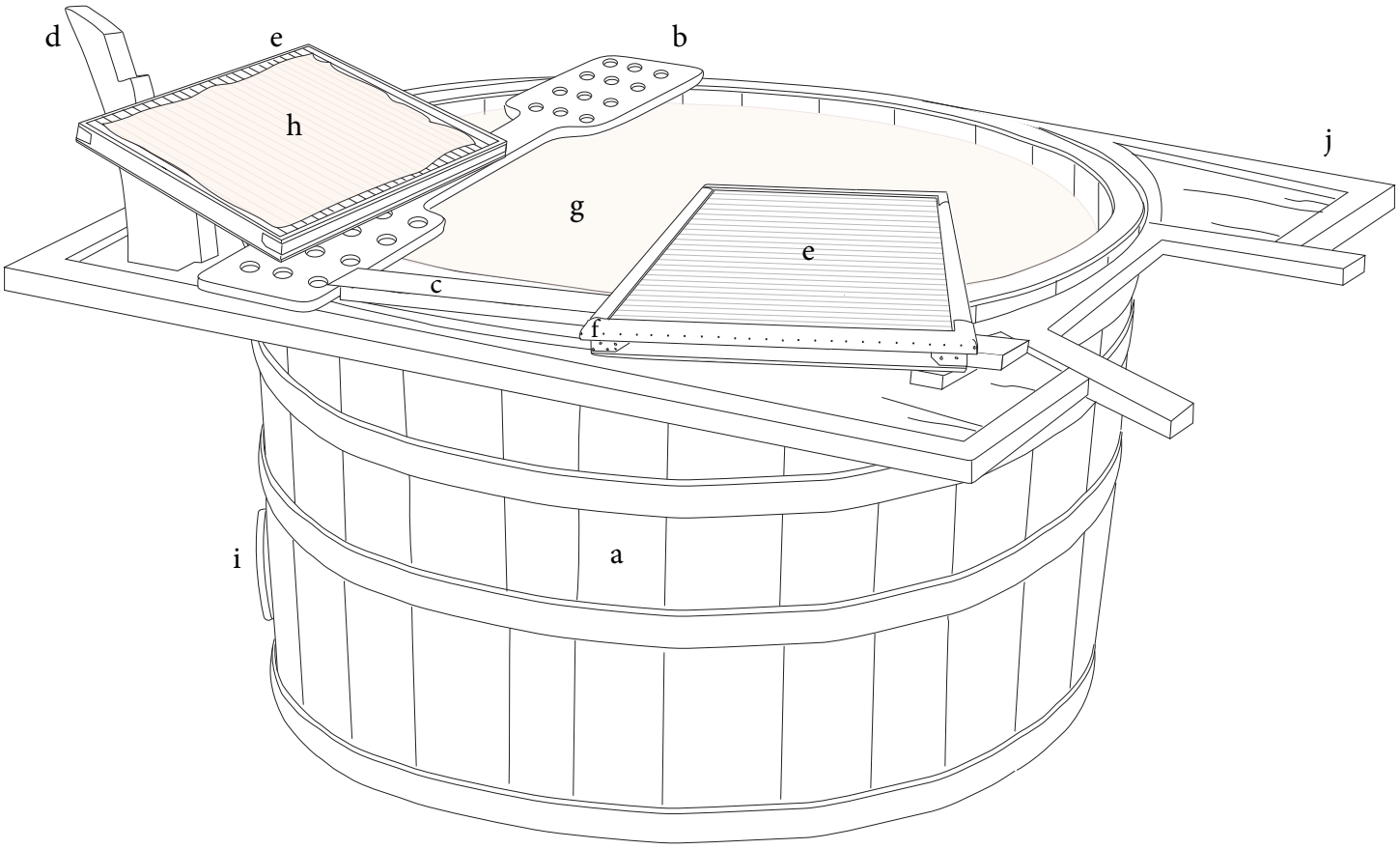
Antique Laid Paper Mould



a: Deckle **b: Laid screen,** mould covering, facing, wire cloth **c: Ribs** **d: Drip line,** drip ribs, water bar (outermost and smaller than central ribs) **e: Brass** reinforcement elements **f: Deckle slip** **g: Sew-down wire** (holding laid screen to ribs)

Appendix C

The Vatman's Workstation



a: Vat **b:** Bridge **c:** Stay **d:** Ass, Asp, or Horn e: Mould **f:** Deckle **g:** Stuff **h:** Newly formed sheet
i: The pot-hole [pistolet], for heating the vat **j: Vat surround** [tour de cuve]

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