

# *The Size of the Sheet in America: Paper-Moulds Manufactured by N. & D. Sellers of Philadelphia*

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A STATEMENT about the dimensions of a book is one of the essential ingredients of bibliographical description. Since it is the original size of the sheet and how it has been folded and trimmed that determines this basic measurement during the hand-press period, bibliographers often supplement the indication of leaf size with such expressions as 'foolscap folio,' 'demy octavo,' or 'royal quarto.' These terms, they hope, provide in a historical fashion additional information about the paper and the imposition scheme used by the printer.<sup>1</sup>

If there is a disadvantage to this form of description, it is in the use of papermaking terms of uncertain meaning. The most commonly used authority for English eighteenth-century paper sizes is 'An act for repealing the present duties upon paper, pasteboards, millboards, and scaleboards, made in Great Britain, and for granting other duties in lieu thereof,' 21 Geo. III cap. 24 (1781). The tables attached to this act

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<sup>1</sup> For some bibliographies using this method, see Philip Gaskell, *John Baskerville: A Bibliography* (Cambridge, Eng., 1959); Allan Stevenson, *Catalogue of Botanical Books in the Collection of Rachel McMaster Miller Hunt . . . Printed Books 1701-1800* (Pittsburgh, 1961); Philip Gaskell, *A Bibliography of the Foulis Press* (London, 1964); Ian MacPhail, *Alchemy and the Occult: A Catalogue of Books and Manuscripts from the Collection of Paul and Mary Mellon Given to Yale University Library* (New Haven, 1968); C. William Miller, *Benjamin Franklin's Philadelphia Printing, 1728-1766* (Philadelphia, 1974).

list writing, printing, and wrapping sizes 'Not exceeding the Dimensions of' some eighty height and width measurements in inches, of which forty-six are for the writing and printing sizes.<sup>2</sup> Unfortunately, these sizes are only rarely confirmed by other English sources and hardly ever by foreign ones. Glancing at Philip Gaskell's table of paper sizes,<sup>3</sup> we see that English printing demy, defined as 50 cm. by 40 cm. in 1713, becomes 56 cm. by 44.5 cm. by 1781. As for imported paper, foolscap becomes *pro patria* in Holland, *tellière* in France, and *propatria* in Germany, all with slightly different dimensions.<sup>4</sup> Varying both in time and in place, papermaking terminology needs verifying evidence: early tables of paper sizes are too few,<sup>5</sup> and papermakers' records, which might allow us to determine how well such papermaking legislation was enforced, are unavailable. There is no reliable guide for American paper of this period.

Establishing format, another usually routine bibliographical calculation, also depends on paper evidence; there are simple rules to be followed and the occasional complicated exception to be observed. Chain-lines running contrary to expectation, horizontally in folios, vertically in quartos, horizontally in octavos, etc., have been shown to be caused by printing on half-sheets of double-size paper<sup>6</sup> or on paper made on side-by-side two-sheet moulds, that is, moulds designed to make two sheets at once, adjacent at their long sides

<sup>2</sup> The 1781 Excise Tax Act is used in Philip Gaskell, *A New Introduction to Bibliography* (New York and Oxford, 1972; repr. with corr., 1975), pp. 73-75; Thomas Balston, *James Whatman, Father & Son* (London, 1957), p. 61; and D. C. Coleman, *The British Paper Industry, 1495-1860* (1958; repr. Westport, Conn., 1975), pp. 350-52.

<sup>3</sup> Gaskell, *New Introduction*, pp. 73-75.

<sup>4</sup> Stevenson, 'A Bibliographical Method for the Description of Botanical Books,' *Catalogue of Botanical Books . . . Introduction to Printed Books 1701-1800* (Pittsburgh, 1961), p. ccxxvii.

<sup>5</sup> Lists of such tables can be found in Gaskell, *New Introduction*, p. 72, and in E. J. Labarre, *Dictionary and Encyclopædia of Paper and Paper-Making*, 2d ed. (Amsterdam, 1952), p. 252.

<sup>6</sup> Allen T. Hazen, 'Eighteenth-Century Quartos with Vertical Chain-Lines,' *The Library*, 4th ser. 16(1935):337-42.



(as in fig. 1).<sup>7</sup> Like other paper-moulds, side-by-side two-

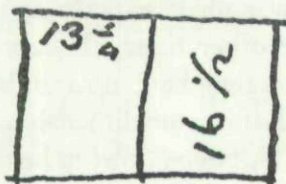


Fig. 1. Side-by-side two-sheet foolscap (*moulds finished November 25, 1794*).

sheet moulds have their ribs and, accordingly, their chain wires parallel to their short sides. However, unlike standard single-sheet moulds or end-to-end two-sheet moulds (the sheets being adjacent at their short sides as in fig. 2), they



Fig. 2. End-to-end two-sheet wrapping (*moulds ordered July 20, 1805*).

will produce paper with 'turned chain-lines,' running lengthwise on the sheet and, consequently, at a ninety-degree angle to the usual direction on the leaf.

The purpose of the following remarks is to provide an idea of American paper sizes from around 1790 to the end of the era of hand papermaking (in the 1830s), using the very detailed account and letter books of the Philadelphia paper-mould manufacturing firm, N. & D. Sellers. Although the account books occur inconveniently late in the history of hand papermaking, they provide considerable information for the years 1788–1824, of which much is applicable to earlier years as well. From pott to mammoth, nearly forty size designations appear in entries for more than 2,460 pairs of writing or printing moulds, each entry mentioning, at least, size name and dimensions.

<sup>7</sup> K. Povey and I. J. C. Foster, 'Turned Chain-lines,' *The Library*, 5th ser. 5(1950): 184–200.

Results for the common sizes will naturally be the most reliable: medium, for instance, was made exactly 18" by 23" in 350 out of 474 pairs. On the other hand, those varieties which appear fewer than 20 times may have no standard size whatsoever, not even 2 pairs with the same dimensions; these figures have had to be averaged. Not even this can be done for 6 sizes represented in the ledgers by only 1 pair.

The study of books with turned chain-lines can also benefit from the Sellers ledgers. The account books contain some entries for double-size moulds and many for two-sheet moulds, side by side in some sizes and end to end in others, sometimes even with diagrams. A statistical examination of these entries reveals how often, when, and in which sizes moulds were made in configurations likely to produce turned chain-lines. The Sellers firm had some correspondence with their papermaking customers concerning these matters, which I shall quote at length along with relevant passages from some hitherto unused eighteenth-century French sources.

Nathan Sellers (1751-1830) is known to have made paper-moulds as early as 1776. His skill at wireworking, evidently not common in America at this time, was sufficiently valued by the Continental Congress that he was recalled from military duty in the same year, most likely to make moulds for currency paper. In 1779 he established the firm of N. & D. Sellers with his younger brother David, manufacturing moulds and various other wire products, wool-carding combs in particular. Wire was usually obtained from England and the wooden frames for the moulds from local carpenters.

Retiring in 1817, Nathan was succeeded by his son Coleman, who had become a partner in the firm by 1815. The firm N. & D. Sellers was dissolved in 1828, Coleman carrying on its papermaking interests first as Sellers & Brandt and then as Coleman Sellers & Sons. Endowed with considerable mechanical aptitude, Coleman developed and marketed a pulp dresser, calendering rolls, wire coverings for cylinder paper-



making machines, and, by 1832, a complete papermaking machine. By the time he died, two years later, the firm had begun to manufacture locomotives and other heavy machinery. Under the next generation of Sellerses, Charles and George Escol, it was bankrupted in the depression of 1837. Escol later gained unwanted literary fame as the model for Col. Escol Sellers in *The Gilded Age* (1873), a collaboration of Mark Twain and Charles Dudley Warner.<sup>8</sup>

Before Nathan Sellers, there were some American-made paper-moulds, fabricated either by the papermaker himself for emergency use or, on rare occasions, by someone who happened to be skilled in wireworking. Most moulds were supplied from abroad, either imported at some expense from England or Holland, or acquired as discards from European papermills. During the Revolution, the American paper industry was forced to become self-sufficient, relying (often in vain) on a domestic supply of rags and papermaking equipment. The Sellers mould-making business, first established as Nathan's contribution to the war effort, soon became a necessary subsidiary industry serving a thriving and increasingly independent American paper trade. The Sellers ledgers offer a self-contained and thorough account of this short-lived industry, Nathan being the first, and his son Coleman being one of the last American professional mould-makers.

The manuscript records of N. & D. Sellers, located at the American Philosophical Society, are in three parts: (1) 'Memorandum of Paper Molds—Ordered'<sup>9</sup> (hereafter cited as *moulds ordered*), where moulds were entered according to the customer's specifications, the entries being crossed out

<sup>8</sup> The firm and its ledgers are thoroughly described by John W. Maxson, Jr., in 'Nathan Sellers: America's First Large-Scale Maker of Paper Moulds,' *Paper Maker* 29 (February 1960):1-15; 'Coleman Sellers: Machine Maker to America's First Mechanized Paper Mills,' *Paper Maker* 30 (February 1961):13-27; and 'George Escol Sellers: Inventor, Historian, and Papermaker,' *Paper Maker* 38 (1969):39-57. See also Dard Hunter, *Papermaking in Pioneer America* (Philadelphia, 1952), pp. 130-39.

<sup>9</sup> *Moulds ordered* December 26, 1796. The date, if lacking in the original has been derived from the preceding dated entry.

when the moulds were completed; (2) 'Molds—when finished—'<sup>10</sup> (hereafter cited as *moulds finished*), the entries having been made for the firm's own records, usually more detailed and methodical than those in *moulds ordered*; and (3) the letter book (1821–34, hereafter cited as *letter*), containing copies of outgoing correspondence to suppliers and customers.<sup>11</sup>

*Moulds finished* entries ideally list the traditional size name, dimensions inside the deckle,<sup>12</sup> the number of ribs (called 'barrs' in the manuscript), the number of laid wires to the inch, the gauge of wire used, watermark, customer, price, and date. The fineness of wove moulds is expressed numerically, the figures originally signifying the number of wires per inch and then the gauge of the wires themselves (*letter* to Conrad Kounslar March 1, 1822).

Of all these specifications, an exact measurement inside the deckle, given in the Sellers ledgers within  $\frac{1}{8}$ " tolerances, was considered to be most important, especially by printers wishing to work with standard sizes. This concern, passed on from printer to papermaker and from papermaker to mould-maker, can be seen in the correspondence of Key & Dalton, stationers in London, with their papermaker William Balston:

We received your favor dated 15th inst. acquainting us the Demy running different sizes shall in future be remedied. We hope it will, as whatever superior qualifications it might have, it's of no avail if it's not all one uniform size; it renders it only saleable for inferior purposes. As we have not the same complaint from any one paper in the house but that, we conceive a proper attention of the mould maker would obviate it. I hope you will pardon my dwelling so much on this point, but it really is a matter of the very first consequence, and without it is effectually

<sup>10</sup> *Moulds finished* March 14, 1815. Undated entries have been treated as in note 9.

<sup>11</sup> Undated letters have been treated as in notes 9 and 10.

<sup>12</sup> See the Ames letter quoted on p. 305, below, *moulds ordered* July 13, 1821, and Hunter, *Papermaking in Pioneer America*, p. 135.



altered, no one will look at a sample of it, and it will remain a complete dead stock to us. The printers cannot fix their forme true unless the size is uniform.<sup>13</sup>

The Sellers record-keeping system was designed to cope with papermakers who expected such a precision instrument but ordered it only in the most imprecise terms. After the customer's letter was transcribed and abridged in *moulds ordered*, a thorough and exact description of the mould would be entered in *moulds finished*, permitting the Sellers firm to deliver a custom-made but, from order to order, absolutely uniform product. *Moulds finished*, for example, almost always substitutes a number signifying laid wires to the inch or the gauge of the wove wire to the customer's stipulation of 'writing' quality as copied down in *moulds ordered*.

Even when the papermaker was kind enough to send in exact measurements, the mould-maker still had to contend with differences in terminology. Certain paper sizes were so ill-defined that a consistent vocabulary for the firm's own use had to be maintained in *moulds finished*. Demy and medium were frequently confused, as can be seen in the following letter placed in the August – December 1809 pages of *moulds ordered*: 'M<sup>r</sup> Ames of Springfield Massachusetts Request M<sup>r</sup> Sellars to be so kind as [to] make him a pare of good demi velum molds  $22\frac{3}{4}$  of an inch by  $17\frac{1}{2}$  inches Square—in the *Size of the the* [*sic*] *deckel from inside to inside*. Let them be of the same quality of velum or fineness that you made the Royal molds of for M<sup>r</sup> Isaac Rily—please to have the frames good and true.' Although isolated pairs of demy wove moulds were made at  $17\frac{1}{2}$ " by 22" and at  $17\frac{1}{2}$ " by  $21\frac{3}{4}$ ", there were a number of medium vellum pairs at  $17\frac{1}{2}$ " by  $22\frac{1}{2}$ ", much closer to Ames's unusual specifications. Whether deliberately or not, the order was renamed without comment and entered

<sup>13</sup> Letter dated February 18, 1809, quoted in Thomas Balston, *William Balston, Paper Maker, 1759–1849* (London, 1954), p. 64.

in the ledgers as 'med vel—17½—22¾' (*moulds finished* October 17, 1809).

The *moulds finished* section also served to establish precedent in case of customer complaints. In the following exchange we see this application and also the entire Sellers record-keeping procedure in action: (1) the original order (expressed in the vaguest terms), (2) its transcription in *moulds ordered*, (3) its amplification and clarification in *moulds finished*, and (4) its final resolution in the letter book.

Updegraff & Walker, papermakers of Mount Pleasant, Ohio, wrote to the Sellers firm, 'We are in want of two pair of molds one of small super royal and one of medium vellum for making printing [i.e., printing paper] on.'<sup>14</sup> The first part of their request was entered in *moulds ordered* December 27, 1821, as '1 pair small superoyal' and in *moulds finished* January 15, 1822, as 'a p<sup>r</sup> Sup<sup>r</sup> Roy<sup>l</sup> 21¼ by 27½ No. 26 [indicating fineness of the wove wire mesh].' After the moulds were delivered, Updegraff & Walker must have sent a complaint about the size of the moulds, for this reply was recorded in the letter book: 'The size not being defined in inches we thought it best to refer to your last molds, which we find were a small pair, the usual size now made are 22 by 31. The molds sent were intended to make a sheet 21 by 27, allowing ½ an inch in length and ¼ in the width for shrinking which is the usual allowance. [This] brings the molds to the exact size stated in your last. The pair we refer to were the only pair we could find on our books, and were had June 27, 1815' (*letter* April 5, 1822).

In despair, some customers endeavored to avoid confusion by sending a specimen sheet along with their order: 'Thomas Levis—Post molds, to the size of the Sheet left' (*moulds ordered* September 12, 1800); 'we have this day sent . . . the Dble Demy molds. They are made the size of the Sheet sent' (*letter* to S. & W. Meeteer July 4, 1823).

<sup>14</sup> Quoted in *letter* April 5, 1822.



As stated in the letter to Updegraff & Walker quoted above, some care had been taken to compensate for the inevitable shrinkage of paper in the drying loft, a concern also evident in this admonition to the papermakers Cramer & Spear: '[We] would be glad if you would always send the measure allowing for shrinkage' (letter November 11, 1828). Estimating shrinkage at  $\frac{1}{4}$ " for the width and  $\frac{1}{2}$ " for the length, the Sellers firm's practice supports E. J. Labarre's definition, "The dimensions of the mould do not always correspond with the size of the paper to be made and are generally larger by  $\frac{1}{4}$ " to  $\frac{1}{2}$ " in either direction, to allow for shrinkage.'<sup>15</sup> Although shrinkage is not mentioned specifically, it may be one reason why Louis-Jacques Goussier's article in the Diderot *Encyclopédie* describes moulds made larger than the desired paper size by four *lignes*, approximately  $\frac{1}{3}$ ", in both directions.<sup>16</sup>

The ledgers differ most noticeably from Labarre and Goussier by calculating twice as much paper-shrinkage in the length ( $\frac{1}{2}$ " ) as in the width ( $\frac{1}{4}$ " ). To estimate the dimensions of Whatman's post moulds from a trimmed sheet, Nathan Sellers added  $\frac{1}{2}$ " to  $\frac{3}{4}$ " to the length and  $\frac{3}{8}$ " to  $\frac{1}{2}$ " to the width, a  $\frac{1}{8}$ " to  $\frac{1}{4}$ " difference which cannot be accounted for by uniform trimming alone: 'A pair of *Whatman's* Post Molds Cutts the sheet when trim'd or shaved on the edges to the Size of  $18\frac{1}{4}$  by  $14\frac{3}{4}$  so that the Deckles must have been  $18\frac{3}{4}$  or 19 Inches by  $15\frac{1}{8}$  or  $15\frac{1}{4}$ ' (*moulds finished* January 1, 1789). This differing compensation for shrinkage may explain why the Sellers standard sizes for foolscap, post, demy, and super royal all have their widths expressed in quarter inches and their lengths in half inches.<sup>17</sup>

Reasoning from evidence in the ledgers, one would be

<sup>15</sup> Labarre, *Dictionary*, p. 166.

<sup>16</sup> Louis-Jacques Goussier, 'Papeterie,' *Encyclopédie, ou Dictionnaire Raisoné des Sciences, des Arts et des Métiers* (Neuchâtel, 1765; facsim. Stuttgart, 1966), 11:838.

<sup>17</sup> See Table 2.

tempted to subtract these fractions from the size of the moulds within the deckle to arrive at the size of the paper. As in the Updegraff & Walker letter, therefore, and in 103 other pairs of  $21\frac{1}{4}$ " by  $27\frac{1}{2}$ " super royal moulds (out of 427 altogether), the final paper product would measure 21" by 27". This method of compensating for shrinkage, however, would eliminate the few substantial areas of agreement between the Sellers ledgers and other major sources for paper sizes. Foolscap, one of the most common (and therefore, one would think, one of the most standardized) papers, measures exactly  $13\frac{1}{4}$ " by  $16\frac{1}{2}$ " both in the Sellers ledgers (426 out of 494 pairs) and in Labarre's *Dictionary*<sup>18</sup>; medium, only slightly less common in the account books (474 pairs), measures inside the deckle 18" by 23" in 350 pairs, corresponding exactly not only with Labarre,<sup>19</sup> but also with the 1781 Excise Tax Act<sup>20</sup> and a list of paper sizes used at the Ivy Mills of Delaware County, Pennsylvania.<sup>21</sup>

It could very well be that these corresponding sizes are coincidental, or that the Sellers firm, despite the assurances in the letter books, habitually ignored the shrinkage factor. On the other hand, the wording of the 1781 Excise Tax Act may provide a means of establishing at least some harmony between the act and the account books. Since shrinkage would make it impossible for paper to conform exactly to one legislated size, the act lists maximum measurements expressed as 'Not exceeding the Dimensions of. . . .' The maximum size of handmade paper is, of course, governed by the deckle. It is also reasonable to expect that after 1781 a papermaker desiring to make the largest, most economical sheet possible, while being absolutely certain of staying within the prescribed limits of the law, would have his deckles regulated

<sup>18</sup> Labarre, *Dictionary*, pp. 259, 269.

<sup>19</sup> *Ibid.*, pp. 262, 270.

<sup>20</sup> 21 Geo. III cap. 24 (1781), table 3.

<sup>21</sup> Joseph Willcox, *Ivy Mills 1729-1866* (Baltimore, 1911), pp. 51-52.



precisely to the legislated maximum dimensions. If this is the case, actual paper samples may be expected to have measurements slightly smaller than those in the Act of 1781.<sup>22</sup>

A number of entries have not been included in this statistical account, primarily those that did not contain the necessary minimum information of size name and dimensions. Also omitted were moulds 'laid over,' that is, frames sent back to have their wire surface replaced or refurbished. Thirdly, board moulds, moulds for sugar paper, brown moulds, fullers' moulds, sheathing moulds, press moulds, and all others not likely to be used for printing, writing, or engraving have not been recorded. Moulds for drawing paper were made infrequently, so much so that the firm kept its own record of drawing paper sizes (table 1). Wrapping moulds of the crown size, however, have been included since there is some evidence that they were occasionally used to make coarse printing paper. Bank moulds, made in arbitrary sizes for currency paper, etc., have not been counted. Finally, those moulds which the Sellers firm itself was unable to classify, described simply as 'laid,' 'vellum,' 'writing,' 'printing,' or 'map Mold[s],' have been omitted.

Beginning with the smallest, each type of mould will be discussed below in order of size, an arrangement that will best demonstrate the relationship, and occasional confusion, between neighboring sizes. Accordingly, double-size moulds (double pott, double foolscap, and double crown) will be found before the sections on medium writing, small royal, and long super royal respectively.

#### POTT

From 1792 through 1817, almost every pair of moulds in this size, twenty-eight out of thirty altogether, measured  $12\frac{5}{8}$ "

<sup>22</sup> A qualification noted by Philip Gaskell in his 'Notes on Eighteenth-Century British Paper,' *The Library*, 5th ser. 12(1957):35, but not by Coleman, *British Paper Industry*, pp. 350-52.

by  $15\frac{5}{8}$ " ,  $\frac{1}{8}$ " longer in each direction than given in the Act of 1781. Only three pairs (1798–1813) were made in the wove style. Twenty of the twenty-seven laid pairs had twenty-two or more laid wires to the inch, and the wove moulds were made with rather fine wire, either no. 36 or no. 45. Like foolscap or post, this variety was of writing quality.

Without exception, the pott moulds in the Sellers account books were termed 'double,' meaning in this case two-sheet moulds rather than double-size moulds. This interpretation of 'double' is based on the recurrent use of four watermarks, one for each sheet, there being four sheets in a pair of two-sheet moulds. In *moulds finished* July 7, 1792, for instance, the watermark was CEB, and the customer was charged for twelve letters; likewise, four plows and four words of six letters each were used in *moulds finished* August 15, 1796.

These two-sheet pott moulds were always made end to end. Since there is no statement to this effect in the ledgers, the end-to-end arrangement had to be calculated from the number of ribs mentioned, fortunately, in twenty-five of the entries. Out of the twenty-seven pairs of laid pott moulds, seven had sixteen ribs and eighteen had fifteen ribs per sheet. The number of ribs also indicates the number of chain-lines in the sheet, the Sellers firm rarely making use of *tranche-fils*, chain-lines placed at both ends of the mould and unsupported by ribs.<sup>23</sup> By dividing the number of intervals between the chain-lines into the long dimension of the pott moulds, assuming them to be of the end-to-end variety, the chain-lines

<sup>23</sup> Two samples of watermarked and dated sheets of foolscap paper with fifteen chain-lines can be compared with entries in the Sellers ledgers, both entries stipulating fifteen ribs to the sheet. In Willman Spawn's paper collection, a foolscap sheet marked 'Bills paid in the year 1818' and watermarked WL corresponds to *moulds finished* June 12, 1813, 'W<sup>m</sup> Levis—Dble Cap.' A sheet of 'Thin common fCap—' ca. 1808 watermarked TG & C<sup>o</sup>, BRANDYWINE, in the Gilpin Collection at the Pennsylvania State Archives, matches *moulds finished* May 18, 1801. If N. & D. Sellers used *tranche-fils* on such two-sheet moulds, both of the sheets would have sixteen chain-lines altogether. See also the Daniel Rhodes foolscap moulds with sixteen ribs compared (below) to DR watermarked foolscap paper with sixteen chain-lines.



will be 23 mm. to 25 mm. apart. If the moulds were side by side, the chain-lines would be 19 mm. to 20 mm. apart.

That the equation for the end-to-end moulds is the more likely of the two can be verified by examining other examples of eighteenth-century pott paper. *A Collection of All the Laws of the Province of Pennsylvania . . .*, Philadelphia: Printed and Sold by B. Franklin, 1742 (Evans 5033), a pott folio with the characteristic watermarks of this size, Arms of London and Arms of Britain,<sup>24</sup> has chain-lines 24 mm. apart in the Chapin Library copy. Arms of London and Arms of Britain watermarks reproduced in Heawood almost always have chain-lines separated 23 mm. to 25 mm. and none as close as 19 mm. to 20 mm.<sup>25</sup>

Pott's end-to-end configuration can be confirmed by comparing it to the next largest size, foolscap, which also has fifteen or sixteen ribs for the laid moulds. As will be shown below, one of the foolscap moulds is diagrammed side-by-side (*moulds finished* November 25, 1794) and has twelve ribs, fewer than in the end-to-end variety since they had to be attached to the short side.<sup>26</sup>

Although there seems to have been no confusion between the two sizes, pott and foolscap were close enough that in at least one case a pair of moulds could be supplied with two sets of deckles, one set for each size (*moulds ordered* May 4, 1797, and *moulds finished* May 12, 1797).

#### FOOLSCAP

Foolscap was the mould size most frequently manufactured by N. & D. Sellers, 494 pairs in all, of which 392 were laid and 102 were wove. By force of repetition, a concept of stan-

<sup>24</sup> See Gaskell, 'Eighteenth-Century British Paper,' p. 38, and Miller, *Franklin's Philadelphia Printing*, no. 288.

<sup>25</sup> Edward Heawood, *Watermarks, Mainly of the 17th and 18th Centuries* (Hilversum, 1957). See nos. 441 through 473 and especially nos. 442, 458, 470, and 471, where pott sheet sizes are given.

<sup>26</sup> Additional evidence for the end-to-end format is presented in the double pott section below.

dard size was established and, after 1806, at least 25 pairs were recorded simply as 'Common Size.' By 1822, the common size became an exclusive one: 'The [fools]cap molds thee observes are to be of the largest size[.]' On referring to our books we find the last cap thee had were  $13\frac{1}{4}$  by  $16\frac{1}{2}$  within the Deckle, which are the largest size we ever made and are the only size now made' (*letter* March 1, 1822).

With eighty-six percent of the entries or 426 pairs measuring  $13\frac{1}{4}$ " by  $16\frac{1}{2}$ ", foolscap is the most consistently predictable size noted in the ledgers.

Of the laid foolscap moulds, 251 pairs had twenty-two or more and only 8 had less than twenty laid wires to the inch. Those moulds specifically identified as of wrapping quality had eighteen wires to the inch (*moulds ordered* November 6, 1807, and *moulds finished* November 17, 1807); printing quality had about twenty to the inch (*moulds finished* November 1, 1788); and writing quality had about twenty-two to the inch (*moulds ordered* January 19, 1804, and *moulds finished* February 24, 1804). Thirty-three wove pairs were made with no. 36 wire, fifty-three pairs with no. 45 wire, and eight pairs with a wove covering finer than no. 45. Exceptional foolscap moulds could be made with coverings as coarse as no. 30 or as fine as no. 60.

Unlike pott, about eighteen pairs of foolscap moulds, both laid and wove, were made as one-sheet 'single' moulds, all in the early years covered by the ledgers, 1792-1810. The laid variety usually had sixteen, less frequently fifteen, and in one case fourteen ribs to the mould. 'Single Cap' moulds at  $13\frac{1}{4}$ " by  $16\frac{1}{2}$ " with sixteen ribs and twenty-three to twenty-four wires to the inch were manufactured for Daniel Rhodes of Amity Township, Berks County, Pennsylvania (*moulds finished* November 4, 1795). Since Rhodes was charged for four letters, each mould was probably watermarked with his initials.<sup>27</sup> The DR watermark appears in the Chapin Library's

<sup>27</sup> See also Hunter, *Papermaking in Pioneer America*, p. 162.



copy of *Letter from the Secretary of the Treasury . . . Exhibiting the Amount of Duties upon Domestic Distilled Spirits and Stills . . .*, Philadelphia: Printed by Way & Groff, 1798 (Evans 34871), an only slightly trimmed folio. With a sheet size of  $13\frac{3}{8}$ " by 16", sixteen chain-lines, and approximately twenty-four wire-lines per inch, the paper used by Way & Groff for this volume may have been made on moulds as specified in the Sellers entry.

Three hundred forty-one pairs of 'double' foolscap moulds, making two sheets at once, were recorded in the ledgers as having sixteen or fifteen ribs, the use of sixteen ribs predominating during 1790-94, gradually replaced by fifteen ribs in the years 1795-1809, and entirely superseded by the smaller number in 1810-19. Since 'single' moulds also had sixteen or fifteen ribs, these figures must apply to the sheet rather than to the entire mould. Again, since 'single' and 'double' moulds were usually entered with the same number of ribs, their sheets must have had similarly arranged chain-lines, which means that the 'double' moulds were generally end to end. The predominance of the end-to-end configuration is confirmed by the occasional entry stipulating the overall measurements of the frames:  $14\frac{1}{2}$ " by 35" (*moulds finished* November 1, 1788; *moulds finished* February 24, 1804).

Either by terminology, diagrams, or number of ribs, at least ten pairs of 'double' foolscap moulds can be considered to have been side by side. Only two pairs were laid, and only these could have produced turned chain-lines. Although made the standard size,  $13\frac{1}{4}$ " by  $16\frac{1}{2}$ ", the 'double cap' moulds of *moulds finished* November 25, 1794, had only twelve ribs and were illustrated with a diagram showing the crop bar parallel to the long sides (fig. 1). Another pair (*moulds finished* October 9, 1806), described as 'Old fash<sup>d</sup> Dble Cap One Deckle to divide,' was also listed with twelve ribs. Using the formula for side-by-side moulds, dividing thirteen chain-line intervals into  $13\frac{1}{4}$ ", we get chain-lines 26 mm. apart, roughly equal to

the distance between end-to-end chain-lines, 25 mm. to 26 mm. These side-by-side moulds had, less one rib (perhaps lying under the crop bar), half the number of ribs for a pair of truly double foolscap-size laid moulds, 16½" by 26½", called 'Old fashion without division' (*moulds finished* June 27, 1799).

Side-by-side wove foolscap moulds were also thought to be made in the 'old way' (*moulds finished* October 4, 1811), and many came with optional deckles, 'one Dble Deckle[, ] one open D°' (*moulds finished* September 18, 1806). Like their laid counterparts, both had fewer ribs, ten in each case, than in the end-to-end configuration, fifty-four pairs having fourteen ribs and ten pairs having fifteen ribs.<sup>28</sup>

From 1822 to the end of the period covered by the ledgers, there were a number of wove foolscap side-by-side moulds called 'Short Cap.' Moulds for Clark & Sharpless initially entered as 'a p<sup>r</sup> of Dble Cap made contrary' (*moulds ordered* February 5, 1822) appeared later as '1 p<sup>r</sup> Short Cap' (*moulds finished* [March?] 30, 1822). This use of 'short' can be contrasted to the expression 'long way' applied to end-to-end double wrapping moulds (*moulds finished* July 29, 1809; see p. 319, below).

Although the extant ledgers do not go beyond January 1824, the letter book (its last entry dated December 30, 1834) suggests that wove side-by-side moulds continued to be made for some years after 1824. The wove end-to-end configuration even seems to have become obsolete:

Do you wish the cap to be long or short cap[?] The short or cross are now in general use (*letter* April 8, 1826).

Are the cap molds to be long or Cross Cap[?] I make 20 pair of Cross or short Cap to one p<sup>r</sup> of Long Cap. . . . The short molds make the same size sheet[, ] only side by side instead of end to end: and are much handier to work (*letter* February 11 1830).

<sup>28</sup> Of the ninety-seven wove foolscap end-to-end ledger entries, twenty-four did not mention the number of ribs.



SPANISH FOOLSCAP

'Spanish Cap' was a slightly more rectangular foolscap with no perceptible standard size, but averaging about  $12\frac{5}{8}$ " by  $17\frac{3}{8}$ ". Including five pairs not specifically identified as 'Spanish' and not watermarked with a Spanish name, ten pairs (out of twenty-three altogether) measured  $12\frac{1}{2}$ " by  $17\frac{1}{2}$ ". The twenty-three pairs in this category appear most frequently in the periods 1810-12 and 1824-26 with one pair made as early as 1806 (*moulds finished* June 10, 1806, phrased 'Spanish Dble Cap'). Twenty-one pairs were laid, made as fine or finer than ordinary foolscap, one pair at twenty-three to twenty-four wires to the inch described as 'Superfine' (*moulds finished* January 7, 1811).

Judging from the number of Spanish foolscap entries charging for four watermarks, using the expression 'Double,' and having seventeen or eighteen ribs per sheet, two-sheet end-to-end moulds were in the majority here as in ordinary foolscap. Side-by-side moulds were manufactured, but not so much by choice as by necessity, a new mould-making machine requiring this configuration:

Our laid mold[s] are done by a machine, and are much superior to any hand work, for wrapping paper they are preferred in general (*letter* December 4, 1822).

As our machine is not calculated to make twice 17 inches we have made them with the sheets laying side by side instead of end to end (*letter* June 15, 1824).

This machine, then, would have been designed to make two-sheet end-to-end foolscap moulds, at  $16\frac{1}{2}$ " long, or two-sheet side-by-side crown-size wrapping moulds, at  $14\frac{1}{4}$ " or  $14\frac{1}{2}$ " wide.<sup>29</sup> As this machine could not make moulds in the end-to-end Spanish size, the following modification was at-

<sup>29</sup> See the section on crown size wrapping moulds below. The machine is described in *Early Engineering Reminiscences (1815-1840) of George Escol Sellers*, ed. Eugene S. Ferguson (Washington, 1965), p. 95.

tempted: 'As he [a Mexican named Brambilas] says it is absolutely necessary that the barrs should run the same way in the paper as in the sample, it compell'd us to make the molds with a barr across the middle the same as the ends of the molds. With the small barrs crosswise thus . . .' (*letter* June 15, 1824). The Sellers firm seems to have offered moulds of this nature to S. & W. Meeteer of Baltimore (*letters* June 15, 1824, and April 29, 1825), without much success, and to Andrew Way of Washington:

After you left here we recollected that the short cap moulds when laid would require the barrs to run lengthwise of the moulds in order to make the sheets in the usual manner. We have made a few pairs for [the] Meeteers in that way. The[y] appear to like them from the number they get of that kind. That you may not misunderstand us we make this drawing [fig. 3] by which you will perceive that the workman holds the moulds with the barrs running from one hand to the other contrary to the usual mode. There is a middle peice [*sic*] into which the ends of the barrs are inserted and on which the middle peice of the deckle cut[s]. Cap paper would perhaps not be saleable with the barr marks going lengthwise of the sheet. Please inform us whether the moulds shall be made long or shortways under the circumstances (*letter* March 9, 1826).

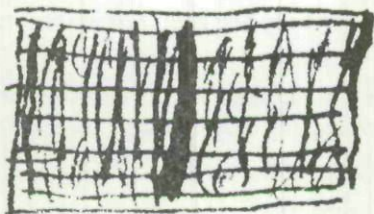


Fig. 3. Side-by-side two-sheet foolscap (ribs parallel to the short side of the sheet) (*letter* March 9, 1826).

In fact, S. & W. Meeteer did not like these moulds very much at all (*letter* August 19, 1824), and the machine was soon altered to make double moulds in the preferred end-to-end configuration (*letter* April 29, 1825). Acting on information provided by J. Barcham Green, Allen Hazen<sup>30</sup> and

<sup>30</sup> Hazen, 'Eighteenth-Century Quartos,' pp. 337-38.



Povey and Foster<sup>31</sup> suggest that such moulds would have had a tendency to clog as they were shaken by the vatman. Nicolas Desmarest, writing in the eighteenth century, proposed another objection to this sort of mould construction, from the viewpoint of the coucher:

We will remark here that the brass wires that constitute the mould's surface are placed parallel to themselves along the long side of the mould, corresponding to the long side of the sheet. This disposition of laid-wires is by no means accidental: it helps the coucher, as we will see below, to detach the sheet from the mould when pressed against the felt. Not only does he detach it while rocking the mould in the shortest direction but also while disengaging the pulp from every space, consecutively, between the laid-wires. Following any other direction, the coucher would detach the sheet in nothing but tatters while both prolonging and increasing his labor. . . .

By the manner in which the coucher holds the mould and applies it to the felt, portions of the sheet lying on and between the laid-wires are detached, lengthwise, one after another, a maneuver that guarantees the success of this both vigorous and delicate operation. If the coucher, however, were to start at the short side of the sheet and to try to detach it by exposing a small portion of all the laid-wires at one time, and by emptying all the intervals between them, he would surely be unable to overcome so many obstacles without tearing the sheet. According to these principles, the coucher always applies his moulds on the side parallel to the laid-wires and couches the entire sheet in a motion perpendicular to the laid-wires and to the intervals between them. . . .

The construction of double moulds and the disposition of laid-wires within them have been determined by these principles. One has been forced to double the moulds lengthwise<sup>32</sup> so as to avoid the problems which we have just mentioned.<sup>33</sup>

<sup>31</sup> Povey & Foster, 'Turned Chain-Lines,' p. 196.

<sup>32</sup> 'Sur la grande dimension.'

<sup>33</sup> Nicolas Desmarest, 'Papier. (Art de fabriquer le),' *Encyclopédie Méthodique. Arts et Métiers Mécaniques* (Paris, 1788), 5:499, 508. My translation. Stating that Desmarest's 'two allusions to them [double moulds] are so slight and casual as to imply that their use was quite unremarkable' (p. 198), Povey & Foster quote two other passages from the same work. On the other hand, in his *Second Mémoire sur la Papeterie* ([Paris], 1778), p. 23, Desmarest himself asserted that 'when we [the French as op-

## LITRESS

Litress, made during 1814–22, was only slightly larger than foolscap, and, with appropriate deckles, both sizes could be made off the same moulds (*moulds finished* December 2, 1820). In one case, moulds were referred to as ‘Dõble Cap, or Littres’ (*moulds finished* April 20, 1816). With ten wove pairs averaging 14" by 16½" and one laid pair measuring 13¾" by 16½", litress appears to have been slightly wider than foolscap. Although litress made in the Willcox mills also seems to have been proportionally wider, it measured as wide as foolscap and ¾" longer in the 1781 Excise Tax Act.<sup>34</sup>

Both laid and wove litress moulds were made with much the same fineness as foolscap. Litress to be ‘Laid fine’ in *moulds ordered* February 3, 1815, appears in *moulds finished* March 16, 1815, at twenty-five to twenty-six laid wires per inch.

There is an occasional mention of side-by-side moulds (*moulds finished* March 2, 1821; *letter* February 7, 1831) but only the wove variety is specified.

## CROWN

Considered to be ‘the common size’ (*letter* December 4, 1822), 14¼" by 18¼" moulds predominate in both laid crown (twenty out of thirty-five pairs) and wove crown (three out of three pairs, made 1822–23). Four pairs of laid crown moulds at 14½" by 18½" were made between 1794 and 1808, one of them described as ‘Common kind’ (*moulds ordered* March 31, 1804).

The foolscap standard of eighteen wires per inch for wrap-

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posed to the Dutch] manufacture two sheets at the same time, which happens rarely, they are not separated in the deckle: we restrict ourselves to moulding a sheet double the ordinary size. . . . Then we separate the sheet with scissors.’

<sup>34</sup> See Table 2.



pings, twenty wires per inch for printings, and twenty-two for writings also seems to be valid for crown (*moulds ordered* October 29, 1811, with *moulds finished* November 6, 1811; *moulds finished* November 1, 1788). Using this standard, the great majority of laid crown moulds were of printing quality, with two pairs in the writing and six pairs in the wrapping categories. Wove moulds were made with no. 40 or no. 26 wire.

Although entered with ordinary crown dimensions, most of the moulds in this section were called 'double crown,' meaning that they were two-sheet moulds. Again, side-by-side moulds can be distinguished from the end-to-end variety by comparing the number of ribs. Pairs of true double crown moulds measuring 19" by 29" and 19" by 28", equivalent to two ordinary crown sheets joined side by side, were recorded with twenty-two ribs in *moulds finished* March 25, 1808, and *moulds finished* August 24, 1805. Seventeen pairs of the two-sheet moulds had exactly half this number of ribs, while seven pairs in the pre-1800 period, when crown was slightly larger, were listed with twelve or thirteen of them. In one case, the side-by-side configuration of these eleven ribs-per-sheet moulds is confirmed by the out-to-out measurements of the wooden frame: '33 by 19: with a cross peice [*sic*]' (*moulds ordered* July 5, 1814, and *moulds finished* July 16, 1814).

As will be shown below, double 'wrapping' moulds, somewhat coarser than crown but usually identical in size, had eleven ribs when side by side and fourteen, fifteen, or sixteen ribs when end to end. In fact, 'a p<sup>r</sup> Double Crown long way' in *moulds ordered* March 3, 1809, became double wrapping, with fourteen ribs per sheet, in *moulds finished* April 13, 1809, confirming that 'long way' was a contemporary expression for end to end.<sup>35</sup>

<sup>35</sup> See also *moulds finished* July 29, 1809, for fourteen rib double wrapping moulds made the 'long way.'

## WRAPPING

At least ten laid pairs, with eighteen to twenty-one wires per inch, were called both 'crown' and 'wrapping,' either as 'Double Crown or Wrapping' (*moulds finished* September 2, 1794) or vice versa: 'Double Wrapping, or Crown' (*moulds finished* May 29, 1794). Wrapping moulds without the 'crown' qualifier still measured the same as crown: out of eighty-seven laid pairs altogether, the sizes 14½" by 18½" (thirty-four pairs made 1794–1809) and 14¼" by 18¼" (eighteen pairs made 1809–21) clearly predominate. Only one wove pair of wrapping has been found (*moulds finished* May 26, 1813).

A large number of coarse double wrapping moulds were, unlike crown, truly of wrapping quality, forty pairs having eighteen or fewer laid wires per inch. Twenty-six pairs had nineteen or twenty wires per inch, and ten pairs had a covering finer than twenty wires per inch. Since paper-moulds were expensive (usually priced between \$22 and \$40 per pair), it is probable that many wrapping moulds were designed to manufacture either wrapping- or printing-quality papers.

Wrapping moulds were usually made side by side (sixty-seven out of eighty-seven pairs), perhaps because the direction of chain-lines in such low-quality paper would be of no consequence. As stated above, these moulds usually had eleven or twelve ribs per sheet (fifty-one and twelve pairs respectively), and as in crown, the twelve ribs-per-sheet moulds were made in the early years covered by the ledgers. Again as in crown, the true one-sheet double wrapping moulds, measuring from 17⅛" by 28" to 19½" by 30", equivalent to two ordinary wrapping moulds connected side by side, had twenty-one up to twenty-four ribs, twice the number of ribs per sheet than in the side-by-side two-sheet moulds.

End-to-end moulds (approximately twenty pairs) were



enough of an exception that many were diagrammed. All of these diagrams but one (*moulds finished* July 5, 1794) were for moulds with fifteen ribs per sheet (*moulds ordered* July 20, 1805, fig. 2) or sixteen ribs per sheet (*moulds finished* June 23, 1801; *moulds ordered* April 29, 1807, and *moulds finished* May 27, 1807), more ribs being needed when connected to the long sides of the mould. Note that these figures correspond to the number of ribs used in ordinary one-sheet wrapping moulds (where the ribs are also connected to the long sides) at fifteen (three pairs), sixteen (three pairs), and eighteen ribs (one oversized pair). One end-to-end pair was called 'fools Cap shape' (*moulds finished* February 10, 1800).

#### DEMY WRITING

Although there is no discernible standard size for demy writing, out of nineteen laid pairs, one pair measured  $15\frac{1}{2}$ " by 20" as in the 1781 Excise Tax Act, ten pairs were slightly wider, and eight pairs measured  $15\frac{1}{2}$ " by  $20\frac{1}{2}$ ". Out of seven wove pairs, one measured  $15\frac{1}{2}$ " by  $20\frac{1}{2}$ ", and three measured  $15\frac{3}{4}$ " by 20". There seems to have been so little standardization in this category that the Sellers firm was unwilling to manufacture moulds unless dimensions were specified by the customer (*letter* April 3, 1822).

Fourteen of the laid pairs, with nineteen to twenty-three wires per inch, seem to have been made as fine as ordinary demy. Four pairs of wove writing demy were furnished with no. 40 wire and one pair (1832) with no. 54, a somewhat finer gauge than that used for ordinary demy.

Owing to the small sample, only one pair, with eighteen ribs, can be definitely identified as a two-sheet mould (*moulds finished* December 13, 1810). Should there have been any other two-sheet moulds, sixteen laid pairs at eighteen ribs and one at seventeen ribs would have to have been end to end (as will be demonstrated in the section on demy, below) and would have produced chain-lines running in the usual direction.

## POST

Eight out of 25 laid pairs and 137 out of 170 wove pairs were made  $16\frac{3}{4}$ " by  $21\frac{1}{2}$ ", a significantly larger size than that given in the definition of post in most sources. The size  $16\frac{3}{4}$ " by  $21\frac{1}{2}$ ", was, however, considered by the Sellers firm to be the common size in 1801 (*moulds ordered April 25, 1801*) and the only size in 1823: 'your last order was for a p<sup>r</sup> royal of which there is but one size made . . . and a p<sup>r</sup> of post, of which the same may be said.  $16\frac{3}{4}$  by  $21\frac{1}{2}$ ' (*letter February 28, 1823*). The Sellers firm's dimensions are actually much closer to large post, at  $16\frac{1}{2}$ " by 21" in some sources,<sup>36</sup> and at  $16\frac{1}{2}$ " by  $20\frac{3}{4}$ " in others.<sup>37</sup> Labarre suggests that there were so many variants of post that it ceased to have any meaning as a size designation and was superseded by large post.<sup>38</sup>

Laid post moulds were all of writing quality, none having fewer than 21 wires to the inch. While 9 pairs of wove post were covered with wire coarser than no. 45, 105 pairs were surfaced with no. 45 wire and 48 pairs with no. 54 wire. There seems to have been an effort, in fact, to make wove post as fine as possible: 'The post thee observes lasted a very short time. They will not last long when they are made of such fine wire. They were N<sup>o</sup> 54. We make them of N<sup>o</sup> 45, 54 and 60' (*letter March 1, 1822; see also letter October 22, 1824*).

Since post was often used as letter paper in the form of folded half-sheets,<sup>39</sup> moulds were occasionally designed to

<sup>36</sup> Labarre, *Dictionary*, p. 202, and Gaskell, 'Eighteenth-Century British Paper,' p. 41, based on R. Johnson's *New Duty on Paper. The Paper-Maker and Stationers Assistant* (London, 1794), reprinting nearly all of the sizes stipulated in 21 Geo. III cap. 24 (1781) but with the addition of 'Post, Thick Large' and 'Post, Thin Large,' both at  $16\frac{1}{2}$ " by 21".

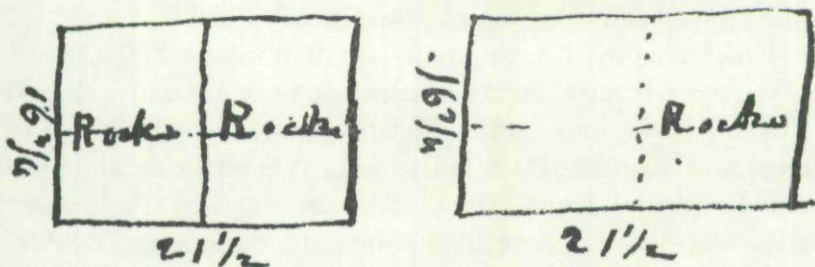
<sup>37</sup> May A. Seitz, *The History of the Hoffman Paper Mills in Maryland* (Towson, Md., 1946), p. 16, and Richard Herring, *Paper & Paper Making*, 3d ed. (London, 1863), p. 120.

<sup>38</sup> Labarre, *Dictionary*, pp. 202-3.

<sup>39</sup> *Ibid.*, p. 202.



make a sheet with watermarks on each side: 'We want to know if Rockville is to be placed twice on each mould: or are the sheets to be finished a folio size: thus [fig. 4] or thus



Figs. 4 & 5. One-sheet post moulds (*letter* May 17, 1827).

[fig. 5][?] These are the size of the moulds except the new deckle which will make a sheet  $15\frac{3}{4}$  by  $21\frac{1}{2}$ [.] In your explanation please make a drawing as above[;] it is easier understood' (*letter* May 17, 1827). This practice of repeating the watermark rather than using a subordinated countermark was mentioned specifically (and illustrated vaguely) in *moulds ordered* February 12, 1801: 'Vellum Post to cut for quarto . . . TG & C<sup>o</sup> [Thomas Gilpin & Company] . . . on each  $\frac{1}{2}$  sheet near the edge.' Although the watermark appears only once in the diagram, the corresponding *moulds finished* entry (April 16, 1801) charged Gilpin for sixteen letters, or for two TG & C<sup>o</sup> watermarks on each mould.<sup>40</sup>

Although trimmed, a sheet of laid post with two repeated watermarks seems to have been used for the frontispiece map in John Drayton's *A View of South-Carolina . . .*, Charleston: Printed by W. P. Young . . . 1802 (Shaw & Shoemaker 2159). Measuring  $16\frac{1}{2}$ " by  $19\frac{3}{8}$ ", the sheet is marked with a dove and AMIES & Co on one half and again, reversed, on

<sup>40</sup> In this case, there was no charge for the ampersand. See Hunter, *Papermaking in Pioneer America*, pp. 135-36.

the other.<sup>41</sup> Wove post moulds of the standard size and with these watermarks were made for Thomas Amies during the preceding year (*moulds finished* June 4, 1801). Since Amies was charged for twenty-eight letters and four doves, there must have been two watermarks on each mould.

Unfortunately, it is impossible to determine whether some of the more hastily sketched diagrams, not drawn to scale and lacking dimensions more often than not, were intended to represent post moulds supplied with two watermarks or divided into two sheets. The double watermarked single sheet alternative seems more likely since the expression 'double' was prefixed to only 3 out of 195 size names in this category. Despite all the specifications taken for granted in these ledgers, two-sheet moulds were invariably called 'double' in all sizes smaller than post.

Given the small sample of laid post, the comparative number of ribs in side-by-side and end-to-end two-sheet moulds cannot be established. Wove post and wove one-sheet demy moulds can be compared, however. Since they tend to have the same length (21½") and the same number of ribs (sixteen, in 124 out of 170 pairs of post and in 38 out of 67 pairs of demy), wove post was probably also constructed as a one-sheet mould.

Even though post made on double moulds is mentioned in the Gilpin papers as early as 1789, this configuration is not found in the Sellers account books until 1819.<sup>42</sup> The earliest clearly identifiable two-sheet post moulds were obviously

<sup>41</sup> Copy at the New York Public Library, classmark ITG. Similarly watermarked frontispiece maps have been found in copies at the Chapin Library, the Huntington Library, and at the New York Public Library, classmark Stuart \*KF 1802. The badly stained and torn map in the American Antiquarian Society copy has no apparent watermark.

<sup>42</sup> 'An Estimate of the Quantity of work to be performed by Journeymen & others employed in the Manufacture of Paper agreed upon by a number of Paper Makers at Philadelphia the 22<sup>nd</sup> of Aug<sup>t</sup> 1789,' Brandywine Paper Mill Letter Book, vol. 4 (December 1807 - December 1808), Gilpin Papers, Pennsylvania State Archives. Allan Stevenson, *Catalogue of Botanical Books*, has found English post paper with turned chain-lines manufactured not after 1753 (Hunt 549).



end-to-end: 'a p<sup>r</sup> of Post Dble length ways like Cap . . .' (*moulds finished* June 11, 1819). A pair of side-by-side moulds watermarked twice for each sheet was entered two years later: 'John Langstroth: a p<sup>r</sup> of Dble Post N<sup>o</sup> 54—made contrary wise: 4 Stars on each mold' (*moulds ordered* December 13, 1821).

#### EXTRA POST

According to Labarre, this name was superseded by 'large post.'<sup>43</sup> Although nothing near a standard size can be perceived in the three laid and seven wove pairs in this category, one laid and four wove pairs do measure 16<sup>3</sup>/<sub>4</sub>" by 21<sup>1</sup>/<sub>2</sub>" as in ordinary post. One pair even smaller than ordinary post was entered with the remark, 'Call'd [e]xtra post,' presumably in the papermaker's order (*moulds finished* June 7, 1804).

#### FOLIO POST

Two pairs, one wove and one laid, were recorded at 17<sup>1</sup>/<sub>4</sub>" by 21<sup>1</sup>/<sub>2</sub>", the same size as the Sellers firm's most frequently occurring demy. The *American Encyclopædia of Printing* defined folio post in 1871 as 'a flat writing-paper, usually 17 by 22 inches.'<sup>44</sup> With twenty-three to twenty-four wires per inch, the laid pair is clearly finer than demy, more of writing than of printing quality.

#### LARGE POST

The Sellers version of large post had the same dimensions as Sellers medium: 18" by 23" (one laid and one wove pair) and 18<sup>1</sup>/<sub>2</sub>" by 22<sup>1</sup>/<sub>2</sub>" (one wove pair). Again, the wove pairs covered with no. 45 wire and the laid pair with twenty-five wires per inch were much finer than most medium moulds.

<sup>43</sup> Labarre, *Dictionary*, p. 202.

<sup>44</sup> *American Encyclopædia of Printing*, ed. J. Luther Ringwalt (Philadelphia, 1871), p. 172.

## DEMY

As seen in folio post, demy and post moulds were frequently equated in the ledgers: four entries were expressed 'Demy or Post' or 'Demy post.' Writing demy moulds (*moulds finished* February 25, 1804) were watermarked with post horns, and one pair of wove demy was supplied with a post deckle (*moulds finished* February 25, 1814).

The measurements  $17\frac{1}{4}$ " by  $21\frac{1}{2}$ " or 'full size Demy' (*moulds ordered* August 11, 1812, and *moulds finished* September 17, 1812) were stipulated in 82 out of 133 laid entries and 45 out of 67 wove entries. The moulds were usually of printing quality, 112 laid pairs being manufactured with nineteen to twenty-three wires per inch and 62 wove pairs with either no. 30 or no. 36 wire. Two laid pairs at twenty-two wires to the inch and one laid pair at twenty wires to the inch were specifically named 'printing.'

After having been invited to dine at Vinters, the English estate of James Whatman II, the American papermaker Joshua Gilpin did not forget to note that Whatman 'thinks well of dble moulds for post, demy etc.' A few days later Gilpin visited the mill of William Lepard who 'on the subject of days works says that they make all [sizes up to royal, specifically pott, foolscap, thick and thin post, and demy] on double moulds & find the paper best as it has longer time to drain the water thro the mould from not being so fast worked.'<sup>45</sup> Printing demy made on double moulds circa 1789 is mentioned in the Brandywine Paper Mill letter book.<sup>46</sup> The Sellers account books show four laid two-sheet demy pairs made between 1795 and 1811 and one pair of wove two-sheet demy

<sup>45</sup> Joshua Gilpin, Journals, Pennsylvania State Archives, vol. 7, March 11, 1796, and vol. 9, March 24, 1796. Two-sheet moulds were probably used for printing demy in England as early as 1712. See Balston, *James Whatman*, pp. 23-24, using information provided by Philip Gaskell.

<sup>46</sup> 'An Estimate of the Quantity of work to be performed by Journeymen . . . 22<sup>nd</sup> of Aug<sup>t</sup> 1789,' Gilpin Papers, Pennsylvania State Archives.



made in 1823.<sup>47</sup> A side-by-side format can be assumed for the laid two-sheet moulds since they were entered with either fourteen or fifteen ribs, significantly fewer than the eighteen or nineteen ribs in single-sheet demy moulds (ninety-two and fourteen pairs respectively). As in the side-by-side moulds of the smaller sizes, fewer ribs per sheet were needed when attached to the shorter end of the frame.

#### FRENCH MOULDS

The earliest American-made wove moulds known to Dard Hunter,<sup>48</sup> 'Joshua Gilpin's French Molds—Cutt the Sheet 17 $\frac{1}{4}$ " by 21 $\frac{7}{8}$ "—(very fine wove wire),' were recorded in *moulds finished* June 5, 1789. Lawrence Greatrake, foreman of the Brandywine Paper Mill, reported to the proprietors that forty-six reams of 'Fine French copper Plate Med[iu]m' had been made in early 1808.<sup>49</sup>

#### LARGE DEMY

Like the 'French Molds,' large demy seems to have had measurements close to medium, one pair at 17 $\frac{1}{2}$ " by 22" entered as 'Large Demy or Medium' (*moulds finished* January 12, 1795). Altogether, four pairs were entered with this name between 1794 and 1803, all of them identifiable as laid moulds. Although only two pairs had the same dimensions, 17 $\frac{1}{2}$ " by 22", all four were indeed slightly larger than demy and were smaller than medium.

#### DOUBLE POTT

Two wove pairs, both measuring 15 $\frac{5}{8}$ " by 25 $\frac{1}{4}$ ", were made for Chauncey Bunce of New Haven in 1814 and 1816. One

<sup>47</sup> The wove moulds were recorded with the size of post (16 $\frac{3}{4}$ " by 21 $\frac{1}{2}$ ") and with the fineness of demy (no. 36 wire), an ambiguity that may have given them the name of 'Dble Demy' in *letter* July 4, 1823, and 'Dble Demy or Post' in *moulds finished* July 4, 1823.

<sup>48</sup> Hunter, *Papermaking in Pioneer America*, p. 135.

<sup>49</sup> Letter dated April 2, 1808, in the Gilpin Papers, Pennsylvania State Archives.

pair of double pott having twenty ribs, two-sheet side-by-side wove pott moulds might be expected to be entered with ten ribs. Since the two-sheet wove moulds were, in fact, entered with twelve or thirteen ribs (one and two pairs respectively, out of three pairs altogether), the end-to-end pott format calculated from the laid moulds is therefore confirmed by the wove variety.

#### MEDIUM WRITING

There seems to be no clearly dominant size in this category. The Sellers firm itself must have thought not, advising one customer: 'The printing medium are of one uniform size viz. 18 by 23 in. The writing are of such various sizes, that we thought it best to consult thee on that point. Please give us the exact size within the Deckle. C. Markle had the last pair of writing medium which were  $17\frac{3}{4}$  by  $22\frac{1}{4}$ ' (*letter* March 1, 1822). Of the seventeen laid pairs and the five wove pairs explicitly identified as medium writing, three wove pairs and three laid pairs measured  $17\frac{1}{2}$ " by  $22\frac{1}{2}$ ", and six laid pairs measured  $17\frac{3}{4}$ " by  $22\frac{3}{4}$ ". On the other hand, nine laid pairs at  $17\frac{3}{4}$ " by  $22\frac{3}{4}$ " and ten pairs at  $17\frac{1}{2}$ " by  $22\frac{1}{2}$ ", five laid and five wove, were entered simply as 'medium.'

The letter quoted above ended with a price list, specifying no. 30 wire for printing and no. 40 wire for writing medium moulds. Four of the 5 writing pairs were made with no. 40 and 187 of 373 ordinary medium with no. 30 wire. Only 3 laid pairs of writing medium, however, had twenty-two or more wires per inch, suggesting that these moulds were defined just as much by the size of their deckles as by the fineness of their wire.

#### MEDIUM

The medium size has been associated with both post and demy. As mentioned above, large post moulds were con-



structed with medium measurements but with finer wire. From 1789 to 1805, there were at least seven cases of demy and medium being equated, usually as 'Demy or Medium' or as 'Demy medium.' In one case, moulds termed 'demi velum' in the papermaker's order were renamed 'med[ium] vel[lum]' in the ledgers.<sup>50</sup>

The dimensions 18" by 23" have been defined as the common size for medium not only in the Sellers account books (*moulds ordered* October 16, 1805, and *moulds finished* November 12, 1805; *letter* March 1, 1822; *letter* May 6, 1824) but also in other sources.<sup>51</sup> Since medium, after foolscap, is the second most frequently occurring size name in the ledgers, familiarity and common usage may have led to some standardization, at least in the wove moulds. Thirty-nine out of 101 medium laid pairs and 311 out of 373 wove pairs (manufactured in the later years of the account books) measured 18" by 23".

The Willcox family of Ivy Mills, Pennsylvania, consistently used medium moulds at 18" by 23", Mark and Joseph Willcox receiving, without exception, at least six standardized pairs 1803-13. Omitting the dimensions, John Willcox ordered a pair of wove medium moulds in 1815, most likely assuming the traditional medium size (*moulds ordered* October 3, 1815). In the following year, he recorded the manufacture of two lots of medium paper for specific books:

May 1st 1816. Made a medium paper for Philip Nicklin to print Calvin's Institutes, to weigh 18 lbs per ream, at \$5.50 per ream.

Dec. 20th 1816. Made a medium paper for Moses Thomas to print Johnson's Dictionary, at \$5.25 per ream.<sup>52</sup>

<sup>50</sup> See *moulds ordered* August-December 1809 and *moulds finished* October 17, 1809, quoted above.

<sup>51</sup> Willcox, *Ivy Mills*, p. 52; Labarre, *Dictionary*, p. 262; 21 Geo. III cap. 24 (1781).

<sup>52</sup> Willcox, *Ivy Mills*, p. 45.

Two well-trimmed copies<sup>53</sup> of the *Institutes of the Christian Religion*, Philadelphia: Published by Philip H. Nicklin and by Hezekiah Howe, New-Haven; William Fry, Printer, 1816 (Shaw & Shoemaker 37152), have a leaf size of 8"–8¼" by 4⅞" in their three octavo volumes. By multiplying the leaf size, the sheet size would have to be *at least* 16½" by 19½", hardly recognizable as medium.

Samuel Johnson's *A Dictionary of the English Language*, Philadelphia: Published by Moses Thomas . . . J. Maxwell, Printer, 1818 (Shaw & Shoemaker 44473), in two quarto volumes, trimmed and in a contemporary binding, has a leaf size of 10¾" by 8½" or a sheet size of *at least* 17" by 21½",<sup>54</sup> somewhat closer to the traditional Willcox size. Considering that Johnson's *Dictionary* measures from ½" to 2" closer to medium than Calvin's *Institutes*, the uncertainty in calculating the original sheet size can be seen to be proportional to the amount of arithmetic needed in the smaller formats. This is especially true for sizes like medium, which falls close between two other very common printing papers, demy and royal.

Sixty-four of the laid medium pairs had twenty to twenty-two wires per inch, twenty-two wires per inch regarded as 'fine' for this size (*moulds finished* August 4, 1798). One hundred eighty-seven wove pairs were covered with no. 30 wire, 147 wove pairs with no. 36, and 19 pairs with no. 45 wire, no. 40 wire being used for medium moulds of writing quality (*letter* March 1, 1822).

Although there is no evidence for the manufacture of two-sheet medium moulds in the Sellers account books, William Balston, Whatman's successor, seems to have had such moulds in 1826.<sup>55</sup> Manufacture of medium on two-sheet

<sup>53</sup> At the Union Theological Seminary Library and the New York Public Library.

<sup>54</sup> Copy in Butler Library, Columbia University.

<sup>55</sup> Dard Hunter, *Papermaking: The History and Technique of an Ancient Craft*, 2d ed., rev. and enl. (New York, 1947), pp. 229–31.



moulds was not mentioned in the 'Estimate of the Quantity of work to be performed by Journeymen . . . 1789.'

#### LARGE MEDIUM

The four laid (1795–1802) and four wove pairs (1801–24) in this category were all of different sizes but were all, with one exception, an inch or more larger than 18" by 23" in one or both directions. Two pairs of 'extra medium vellum,' measuring 19" by 23<sup>3</sup>/<sub>4</sub>", were ordered by Isaac Levis in 1817 and 1818.

#### 'OLD FASHIONED' DOUBLE FOOLSCAP

This size occurs twice in the ledgers, at 16<sup>1</sup>/<sub>2</sub>" by 26<sup>1</sup>/<sub>2</sub>" (*moulds finished* June 27, 1799) and at 16" by 27<sup>1</sup>/<sub>2</sub>" (?) (*moulds finished* October 9, 1806). While both deckles were most likely identical in the earlier entry ('Double Cap Old fashion without division'), the 1806 entry specified a deckle designed to make two single foolscap sheets ('Old fash<sup>d</sup> Dble Cap . . . One Deckle to divide').

#### SMALL ROYAL

There is only one, laid pair by this name, measuring 19" by 23<sup>1</sup>/<sub>4</sub>" (*moulds finished* July 10, 1799).

#### ROYAL

In one case, moulds measuring 19<sup>1</sup>/<sub>8</sub>" by 23<sup>1</sup>/<sub>2</sub>" were called 'Large Medium or Royal' (*moulds finished* August 31, 1801), probably because the 19<sup>1</sup>/<sub>8</sub>" measurement had come to be associated with royal in the Sellers ledgers. When Conrad Kounslar ordered 'med:' moulds with royal dimensions (*moulds ordered* April 27, 1824), a written explanation was called for: 'The pair called medium are the roy<sup>l</sup> size: med: being 18 by 23[, ] Roy<sup>l</sup> 19<sup>1</sup>/<sub>8</sub> by 24—these are what are termed standard sizes, seldom varying much eather [*sic*]

way: hope there may be no mistake: we have made them  $19\frac{1}{16}$  by 24 as p<sup>r</sup> order' (*letter* May 6, 1824).

As early as 1807,  $19\frac{1}{8}$ " by 24" appeared as the 'Royal . . . (laid) Common Size' (*moulds ordered* November 16, 1807). By 1823, 'there is but one size made viz  $19\frac{1}{8}$ . by 24 in.' (*letter* February 28, 1823), and in 1826 the same measurements were the 'common size . . . the standard printing size' (*letter* December 4, 1826).

These dimensions were entered for 83 out of 139 laid pairs and 69 out of 97 wove pairs. Eight laid and 3 wove pairs measured 19" by 24", a writing size according to several sources.<sup>56</sup> Out of 8 pairs specifically identified as writing, 3 pairs measured  $19\frac{1}{8}$ " by 24" and 3 pairs  $19\frac{1}{2}$ " by  $24\frac{1}{2}$ ". R. Johnson, who almost always followed the 1781 Excise Tax Act sizes in his tables, seems to have rejected the 20" by 26" and the  $19\frac{1}{2}$ " by  $24\frac{1}{4}$ " royal printing sizes in favor of  $19\frac{1}{4}$ " by 24", the royal writing size in the act, used for both royal writing and royal printing in his work.<sup>57</sup>

Most of the Sellers royal moulds were of printing quality. One hundred fifteen laid pairs, including 6 of those called writing, had twenty-two or fewer wires per inch. Only 9 wove pairs were furnished with no. 40 or finer wire.

#### LARGE ROYAL

Of no discernible standard size, seven laid pairs (1789–1804) and six wove pairs (1794–1810) can be averaged to approximately 20" by  $25\frac{1}{4}$ ". A pair of large royal writing moulds was provided with two different deckles, measuring  $19\frac{1}{2}$ " by 25" and 19" by 24" (*moulds finished* November 9, 1803).

<sup>56</sup> Thomas F. Adams, *Typographia*, 3d ed. (Philadelphia, 1845), p. 279 ('As Made by Machinery'); Herring, *Paper*, p. 121 (writing); Seitz, *Hoffman Paper Mills*, p. 16 ('Book and Drawing papers'); Labarre, *Dictionary*, p. 230 ('Small Royal' writing).

<sup>57</sup> *New Duty on Paper. The Paper-Maker and Stationers Assistant* (London, 1794), A5v–A6.



DOUBLE WRAPPING

These moulds were usually entered with a qualifier such as 'undivided' (*moulds finished* June 29, 1796) or 'without division' (*moulds finished* September 12, 1801) to distinguish them from the two-sheet variety of the same name. Averaging about  $18\frac{1}{2}$ " by  $28\frac{2}{3}$ ", all seven pairs were laid and had between eighteen and twenty wires to the inch.

DOUBLE CROWN

Distinguished from two-sheet moulds in the same fashion as double wrapping, nine pairs were made at or between 18" by 27" and 21" by 33", averaging about  $19\frac{1}{2}$ " by  $29\frac{3}{4}$ ". All were laid moulds, like double wrapping, and varied from sixteen to twenty-one wires per inch.

LONG SUPER ROYAL

One laid pair was made in this size,  $18\frac{1}{4}$ " by  $28\frac{1}{2}$ " (*moulds finished* August 24, 1808).

SUPER ROYAL WRITING

Out of seven laid pairs (1794–1820), three pairs measured  $19\frac{1}{2}$ " by  $27\frac{3}{4}$ ", all of them averaging  $19\frac{1}{2}$ " by  $27\frac{5}{8}$ ". Two wove pairs (1820–21) measured 20" or  $20\frac{1}{2}$ " by 27". The wove moulds were covered with no. 30 or no. 36 wove wire, and the laid moulds had from eighteen to twenty-one wires per inch.

SUPER ROYAL

Although 'super royal' is the third most frequently mentioned size name in the ledgers (427 pairs), it is one of the least standardized. Since these moulds could not be sold as stock, being more or less custom-made, papermakers were urged to be as specific as possible in their orders: 'there are so many sizes of S. Roy<sup>l</sup> that we should run a risque in deciding,

and would be glad if you would always send the measure allowing for shrinkage.<sup>58</sup>

Nevertheless, several dominant sizes in this category can be detected. Out of 335 laid pairs, 85 pairs measured  $21\frac{1}{4}$ " by  $27\frac{1}{2}$ ", 63 pairs  $20\frac{1}{2}$ " by  $26\frac{1}{2}$ ", and 28 pairs  $21\frac{3}{4}$ " by  $27\frac{1}{2}$ ", the first size most likely superseding the third one, of which all but two pairs were manufactured in the early years covered by the ledgers, 1794–1804. There are still 159 laid pairs that do not conform to any of these three sizes. Out of 92 wove pairs, 19 pairs were made  $21\frac{1}{4}$ " by  $27\frac{1}{2}$ " and 17 pairs  $20\frac{1}{2}$ " by  $26\frac{1}{2}$ ", leaving 56 pairs unaccounted for. Several sources consider 21" by 27", or  $21\frac{1}{4}$ " by  $27\frac{1}{2}$ " after shrinkage (*letter* April 5, 1822), to be printing super royal.<sup>59</sup> The  $20\frac{1}{2}$ " by  $26\frac{1}{2}$ " dimensions approach the larger of the 1781 Excise Tax Act's two royal printing sizes, that is, 20" by 26".

Both  $20\frac{1}{2}$ " by  $26\frac{1}{2}$ " and  $21\frac{1}{4}$ " by  $27\frac{1}{2}$ " moulds were occasionally called 'Small Super Royal' as in a letter to Philip King: 'Small Super Royal are of 2 sizes viz  $20\frac{1}{2}$  by  $26\frac{1}{2}$  and  $21\frac{1}{4}$  by  $27\frac{1}{2}$ .'<sup>60</sup> Some  $20\frac{1}{2}$ " by  $26\frac{1}{2}$ " moulds were described in the same way, but indirectly: 'a p<sup>r</sup> com[mon] Size Sup[er] Royal paper molds, *not largest*' (*moulds ordered* May 17, 1810, and *moulds finished* May 26, 1810). As will be shown below, large super royal and, later, extra super royal were just slightly smaller or sometimes even identical to imperial, averaging at 22" by 31".

The size  $20\frac{1}{2}$ " by  $26\frac{1}{2}$ " was frequently identified as 'Baltimore size,'<sup>61</sup> a term used by Samuel and William Meeteer,

<sup>58</sup> *Letter* November 11, 1828. See also *letter* February 6, 1822, and *letter* April 5, 1822, partially quoted above.

<sup>59</sup> Seitz, *Hoffman Paper Mills*, p. 16; Herring, *Paper*, p. 121; Adams, *Typographia*, p. 279 ('As Made by Machinery').

<sup>60</sup> *Letter* December 7, 1822. See also *moulds ordered* January 4, 1816, and *moulds finished* February 1, 1816; *moulds ordered* December 27, 1821, and *moulds finished* January 15, 1822; *moulds ordered* December 6, 1822, and *moulds finished* December 31, 1822.

<sup>61</sup> *Moulds ordered* June 18, 1812, and *moulds finished* July 7, 1812; *moulds ordered* May 6, 1817, and *moulds finished* May 12, 1817; *moulds ordered* December 10, 1817, and *moulds finished* December 17, 1817; *moulds ordered* May 25, 1819, and *moulds finished* June 1, 1819.



agents for the Sellers firm in that city (*letter* December 16, 1825). Moulds of this size ordered by Jacob Johnson for Fielding Lucas, Jr., Baltimore, were described as 'a p<sup>r</sup> Super royal of usual printers size' (*moulds ordered* May 11, 1814, and *moulds finished* July 6, 1814).

Just as the 20½" by 26½" moulds were associated with Baltimore, super royal at 21¼" by 27½" was called 'Philadelphia size' (*letter* March 26, 1830; see also *letter* November 13, 1829). Earlier, it was known as 'a size only used in the Western Country' (*letter* April 5, 1822, to Updegraff & Walker in Mount Pleasant, Ohio) or as 'Country Pap<sup>r</sup>' (*moulds ordered* May 27, 1824), and earlier still as 'full size' (*moulds ordered* December 4, 1814; *moulds ordered* January 27, 1816, and *moulds finished* March 1, 1816).

Very few super royal moulds of writing quality seem to have been made by the Sellers firm. For laid moulds in this size, the standard fineness on one occasion was defined as eighteen to twenty wires per inch (*moulds ordered* June 3, 1817), the account books listing 133 pairs with twenty to twenty-two wires per inch and 166 pairs with fewer than twenty wires per inch. While no. 40 wire was considered to be of writing quality for royal (*moulds ordered* August 25, 1818), only eight wove super royal moulds were covered with no. 36 or finer wire.

Two pairs of super royal moulds were commissioned especially for newspapers: the *National Intelligencer* in Washington (*moulds ordered* July 9, 1817, and *moulds finished* September 12, 1817) and the Baltimore *Federal Republican* (*moulds ordered* May 12, 1817). A. R. Levering of Baltimore ordered '1 p<sup>r</sup> Sup Royal for News papers' at 20½" by 26½" (*moulds ordered* September 23, 1808).

#### IMPERIAL WRITING

Three pairs with this size name were made between 1803 and

1820, measuring 21½" by 30", 22" by 30½",<sup>62</sup> and 26" by 31". The 26" by 31" moulds were laid, with twenty to twenty-one wires per inch, and their second deckle was divided, designed to make 15" by 24" sheets.

#### ELEPHANT

Three pairs were made in this size, 1795–1807, all of them laid with eighteen to nineteen wires per inch. All three pairs had dimensions slightly larger than those in the 1781 Excise Tax Act (23" by 28"<sup>63</sup>): 23½" by 28", 23" by 28½", and 23¼" by 29". A pair of laid moulds measuring 25" by 30" was called 'Elephant or Imperial' (*moulds finished* July 13, 1802).

#### LARGE OR EXTRA SUPER ROYAL

Most moulds between Philadelphia-size super royal and imperial seem to have been routinely classified as large super royal (four laid and three wove pairs, 1794–1813) and later as extra super royal (eleven laid and thirty-seven wove pairs, 1809–24). Having no apparent dominant size, the fifteen laid pairs averaged 22" by 29⅞". The forty wove pairs were equally varied, but half of them, at least, can be subdivided into three groups: eight pairs at 22" by 31" (as in imperial), five pairs at 21¾" by 31", and seven pairs at 21½" by 31".

Like super royal, the laid moulds had eighteen to twenty wires per inch, and only four wove pairs were covered with no. 36 or finer wire.

As in the case of super royal, two pairs were made specifically for newspapers, the *New-York Gazette*<sup>64</sup> and the *Federal*

<sup>62</sup> A size close to the 22" by 30¼" measurements mentioned in the Excise Tax Act of 1781 (for imperial 'Writing' and 'Writing or Copper-plate Printing') and in Seitz, *Hoffman Paper Mills*, p. 16 (imperial 'Book and Drawing papers').

<sup>63</sup> Elephant and elephant 'Cartridge paper' measure 23" by 28" in Herring, *Paper*, p. 121, and Seitz, *Hoffman Paper Mills*, p. 16, respectively.

<sup>64</sup> 'Langs Gazett[e] of New York' (*moulds ordered* January 6, 1809, and *moulds finished* January 24, 1809).



*Gazette & Baltimore Daily Advertiser*.<sup>65</sup> Both pairs were wove, covered with no. 24 and no. 30 wire respectively.

#### IMPERIAL

Besides the eight pairs of wove extra super royal moulds identical in size (22" by 31") and quality to six pairs of imperial, two pairs were entered with both size names: 'imperial Super Royal' (*moulds ordered* December 6, 1819) and 'a pair of Imperial or Extra Super Royal Molds' (*moulds ordered* April 19, 1821). As usual, the mould-makers and papermakers occasionally disagreed about terminology:

We have thy letter by us of April 1819 ordering the Imperial. The order was simply for a pair Super Royal molds 31¼ by 22¼ without anything said of vellum or laid (*letter* March 1, 1822).

We . . . were sorry you were rendered uneasy by the Imperial molds we sent you being called E.S. Roy! They are the same molds one of your firm laid aside for you (and are as often called by one name as the other) (*letter* December 4, 1922).

An imperial common size was rather tentatively defined as 22" by 31" or 32" in 1827,<sup>66</sup> and the Sellers firm seems to have been even less certain a year earlier: 'The Imperial we seldom make in advance as their sizes are so various' (*letter* September 2, 1826). Thirteen laid pairs were made between 1813 and 1824 in sizes varying from 21" by 31" to 23" by 33", averaging about 22" by 31¼". Six wove pairs (1821-27) out of twenty-eight altogether (1819-33, one pair in 1811) measured 22" by 31", almost all the other moulds being slightly larger.

Twelve of the twenty-eight wove pairs were furnished with

<sup>65</sup> 'Pf wove Sup<sup>r</sup> Roy<sup>l</sup> same Size as the federal Gazette & Balt<sup>o</sup> Daily Advertiser' (*moulds ordered* November 22, 1816) entered later as extra super royal (*moulds finished* December 5, 1816).

<sup>66</sup> *Letter* January 2, 1827. The 22" by 32" measurements also occur in Adams, *Typographia*, p. 279 (imperial 'As Made by Machinery'); Labarre, *Dictionary*, p. 130 ('Large Imperial'); and Willcox, *Ivy Mills*, p. 52 ('Manslaughter').

no. 30 or coarser wire, five pairs with no. 36, two pairs with no. 45, and two pairs with no. 60 wire. The laid moulds had eighteen to twenty-two wires per inch.

#### SMALL ATLAS

One pair at  $25\frac{3}{4}$ " by  $31\frac{1}{2}$ " with no. 45 wove wire was manufactured in 1810 for Joshua and Thomas Gilpin. These moulds were first entered with no size name, 'a p<sup>r</sup> wove molds' (*moulds ordered* September 22, 1810) and then as 'Elephant,' which was crossed out and replaced by 'Small atlas' (*moulds finished* November 2, 1810). The 'Writing or Copper-plate Printing' table of the 1781 Excise Tax Act listed small atlas at 25" by 31".

#### COLUMBIA

Although mentioned three times in the letter book 1825-26, this size name, perhaps a patriotic corruption of the French 'colombier,'<sup>67</sup> appears only once with dimensions,  $23\frac{1}{2}$ " by 35" (*moulds ordered* May 21, 1807). In a list of drawing paper sizes (*moulds finished* January ?, 1824), it was spelled 'Columbier' and measured 23" by 34". According to the French Act of September 18, 1741, 'Grand-colombier, ou Impérial,' was to measure 31 *pouces* 9 *lignes* by 21 *pouces* 3 *lignes*, or 33.84" by 22.65".<sup>68</sup> 'Colombier' in the 'Writing or Copper-plate Printing' table of the 1781 Excise Tax Act was not to exceed the dimensions of  $23\frac{1}{2}$ " by  $34\frac{1}{2}$ ".

#### MAMMOTH

This name was applied to the largest moulds in the Sellers ledgers, measuring 24" by  $39\frac{1}{2}$ " and covered with no. 45 wove wire (*moulds finished* April 8, 1808). I have not been able to find the word used elsewhere as a papermaking term.

<sup>67</sup> Labarre, *Dictionary*, p. 53.

<sup>68</sup> 'Tarif des grandeurs & des poids des différentes sortes de Papiers qui se fabriquent dans le Royaume, fixé par arrêt du conseil d'état du 18 Septembre 1741,' *Encyclopédie* (1765), 11:844.



Although the *moulds finished* portion of the existing ledgers ends in January 1824, the letter book continues through December 1834. After 1824, the letters begin to demonstrate the Sellers firm's gradual, and sometimes reluctant, accommodation with the demand for machine-made paper. While warning their customers against the new cylinder machines, the firm was supplying wire coverings for them by 1829 (*letter* August 18, 1829). The following extracts from the letter books indicate the firm's changing position: 'the Cylinder paper is not in good repute as Mold paper but if you should be tempted to try them we should like to furnish them' (*letter* April 29, 1830); 'we make as many Cylinders as Molds' (*letter* September 13, 1831); 'we make more Cylinders than Moulds' (*letter* June 28, 1832).

A statistical examination of the Sellers account books suggests that mould-making was being phased out somewhat earlier than the 1830s. The production of moulds in all of the six major varieties (foolscap laid, demy laid, royal laid, super royal laid, post wove, and medium wove) decreased noticeably between 1810 and 1820.

According to the *American Encyclopædia of Printing*, it was English excise legislation and the practice of hand papermaking that initially regulated American paper sizes, uniformity being undermined later (one supposes) by American independence and the endless web of the papermaking machine.<sup>69</sup> On the other hand, despite diminishing production, the percentage of uniform mould measurements in the six major paper sizes of the Sellers ledgers actually increased between 1785-89 and 1820-24. While laid foolscap stayed more or less consistent, the two major wove sizes and laid super royal became very much more standardized in the last years described in the ledgers. The trend towards greater regularity was interrupted only in 1800-1804, when the percentage of standard-sized laid foolscap, demy, royal, and super royal

<sup>69</sup> *American Encyclopædia of Printing*, p. 139.

declined, perhaps in response to the introduction of wove moulds.

The Sellers firm, no doubt wishing to simplify their record keeping and to benefit from their mould-making machinery, frequently urged their standard sizes on their customers. Standardization of paper sizes and of size nomenclature would have also allowed them to mass-produce moulds for stock. Given their near monopoly on paper-mould manufacture, some standardization was probably achieved, at least until the advent of the papermaking machine.

Although the last word on the size of the sheet was reserved for the printer and stationer, the mould-maker also had his say. His records, especially when they are as detailed as the Sellers ledgers, can provide direct, empirical evidence for paper sizes, evidence that is clearly more reliable than that transmitted by papermaking tradition or by government legislation.

Table 1

DRAWING PAPER SIZES	
Antiquarian	36"-54"
Double Elephant	27"-40"
Eagle	24"-39"
Atlas	26"-31"
Columbier	23"-34"
Elephant	23"-27"
Imperial	21"-29"
Super Royal	19"-27"
Royal	19"-24"
Medium	18"-23"
Post	16 <sup>3</sup> / <sub>4</sub> "-21 <sup>1</sup> / <sub>2</sub> "
Demy	15"-19"
Crown	14 <sup>1</sup> / <sub>4</sub> "-18 <sup>1</sup> / <sub>4</sub> "
Foolscap	13"-16"

SOURCE: Sellers ledgers, vol. 2 (ca. 1824). American Philosophical Society.



Table 2

## SOME NAMES FOR ANGLO-AMERICAN PAPER SIZES AND THEIR MEASUREMENTS

	1718-1776	1781-1784	1794	1788-1824	1830?	1844	1855	not after 1866	1952
Pott	12 $\frac{1}{4}$ x15 $\frac{1}{2}$	12 $\frac{1}{2}$ x15 $\frac{1}{2}$ <sup>eg</sup>	12 $\frac{1}{2}$ x15 $\frac{1}{2}$	12 $\frac{5}{8}$ x15 $\frac{5}{8}$	12 $\frac{1}{2}$ x15 <sup>g</sup>	—	12 $\frac{1}{2}$ x15	—	12 $\frac{1}{2}$ x15
Foolscap	13x16 <sup>g</sup>	13 $\frac{1}{2}$ x16 $\frac{3}{4}$ <sup>eg</sup>	13 $\frac{1}{2}$ x16 $\frac{3}{4}$	13 $\frac{1}{4}$ x16 $\frac{1}{2}$	13 $\frac{1}{2}$ x16 $\frac{1}{2}$ <sup>g</sup>	14x17	13 $\frac{1}{2}$ x17	14 $\frac{1}{4}$ x16 $\frac{3}{4}$	13 $\frac{1}{4}$ x16 $\frac{1}{2}$ <sup>g</sup> 13 $\frac{1}{2}$ x17
Littriss	—	13 $\frac{1}{2}$ x17 $\frac{1}{2}$ <sup>e</sup>	13 $\frac{1}{2}$ x17 $\frac{1}{2}$	[14x16 $\frac{1}{2}$ ]	—	—	—	15 $\frac{1}{4}$ x16 $\frac{3}{4}$	—
Crown	14 $\frac{1}{2}$ x18 $\frac{1}{4}$	15x20	15x20	14 $\frac{1}{4}$ x18 $\frac{1}{4}$	16 $\frac{1}{2}$ x21	15x20	—	—	15x20
Demy Writing	15 $\frac{1}{4}$ x19	15 $\frac{1}{2}$ x20	15 $\frac{1}{2}$ x20	[15 $\frac{1}{2}$ x20 $\frac{1}{2}$ ]	—	—	15 $\frac{1}{2}$ x20	—	15 $\frac{1}{2}$ x20 17x22 $\frac{1}{2}$
Post	14 $\frac{3}{4}$ x19 <sup>a</sup>	15 $\frac{1}{4}$ x19 $\frac{1}{2}$ <sup>g</sup>	15 $\frac{1}{4}$ x19 $\frac{1}{2}$	16 $\frac{3}{4}$ x21 $\frac{1}{2}$	15 $\frac{1}{2}$ x19 <sup>g</sup>	16x21 <sup>b</sup>	15 $\frac{1}{4}$ x18 $\frac{3}{4}$	17x21 $\frac{1}{2}$	15x19 16 $\frac{1}{2}$ x21 <sup>a</sup>
Demy	15 $\frac{3}{4}$ x19 $\frac{3}{4}$	17 $\frac{1}{2}$ x22	17 $\frac{1}{2}$ x22	17 $\frac{1}{4}$ x21 $\frac{1}{2}$	16 $\frac{1}{2}$ x20 $\frac{3}{4}$ <sup>g</sup> 17 $\frac{3}{4}$ x22 $\frac{1}{2}$	17x22	16 $\frac{1}{2}$ x20 $\frac{3}{4}$ <sup>a</sup> 17 $\frac{3}{4}$ x22 $\frac{1}{2}$	16x21	17 $\frac{1}{2}$ x22 $\frac{1}{2}$
Double Pott	—	17x25 $\frac{1}{2}$	17x25 $\frac{1}{2}$	[15 $\frac{5}{8}$ x25 $\frac{1}{4}$ ]	15 $\frac{1}{2}$ x20 <sup>c</sup>	—	15x25 <sup>d</sup>	—	15x25
Medium Writing	—	17 $\frac{1}{2}$ x22 $\frac{1}{2}$	17 $\frac{1}{2}$ x22 $\frac{1}{2}$	[17 $\frac{1}{2}$ x22 $\frac{1}{2}$ ] [17 $\frac{3}{4}$ x22 $\frac{3}{4}$ ]	18x22 $\frac{1}{2}$	—	17 $\frac{1}{2}$ x22	—	18x23
Medium	—	18x23	18x23	18x23	18 $\frac{1}{4}$ x23	18 $\frac{1}{2}$ x23 $\frac{1}{2}$	18 $\frac{1}{2}$ x23	18x23	18x23
Royal	18 $\frac{1}{2}$ x23 $\frac{1}{2}$	19 $\frac{1}{2}$ x24 $\frac{1}{4}$	19 $\frac{1}{4}$ x24	19 $\frac{1}{8}$ x24	20x25	19x24 20x25	20x25	21x24	19x24 <sup>g</sup> 20x25
Double Crown	—	20x30	20x30	[19 $\frac{1}{2}$ x29 $\frac{3}{4}$ ]	20x30	—	20x30	—	20x30
Super	23x23 $\frac{1}{2}$	19 $\frac{1}{4}$ x27 $\frac{1}{2}$ <sup>g</sup>	19 $\frac{1}{4}$ x27 $\frac{1}{2}$ <sup>g</sup>	20 $\frac{1}{2}$ x26 $\frac{1}{2}$	21x27	21x27	21x27	20 $\frac{1}{4}$ x27 $\frac{1}{2}$	19x27 20 $\frac{1}{2}$ x27 $\frac{1}{2}$
Royal	—	23x28 <sup>e</sup>	23x28	21 $\frac{1}{4}$ x27 $\frac{1}{2}$	23x28 <sup>f</sup>	—	23x28	—	23x28
Elephant	—	22x30 $\frac{1}{4}$ <sup>g</sup>	22x30 $\frac{1}{4}$	[23 $\frac{1}{4}$ x28 $\frac{1}{2}$ ]	22x30 $\frac{1}{4}$ <sup>e</sup>	22x32	22x30	22 $\frac{1}{2}$ x30 $\frac{1}{2}$	22x30
Imperial	—	—	—	[22x31]	—	—	—	—	—

<sup>a</sup> Large post. <sup>b</sup> Folio post. <sup>c</sup> Book and Drawing papers. <sup>d</sup> 25" by 30" in first edition (1855) corrected to 15" by 25" in third edition (1863).

<sup>e</sup> 'Writing or Copper-plate Printing.' <sup>f</sup> 'Cartridge paper.' <sup>g</sup> Writing paper.

## SOURCES FOR TABLE 2

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- 1794 R. Johnson, *New Duty on Paper. The Paper-Maker and Stationers Assistant* (London, 1794).
- 1788-1824 Standard sizes as derived from the Sellers ledgers, except for the bracketed measurements which were averaged or taken from statistically small samples.
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