full-size equipment and appliances, with an abundance of clear water, considerable power, and, what is most important, highly skilled workers. A handmade-paper mill is not a matter of an expenditure of a few hundred dollars, but represents an investment running into the thousands. The one-vat mill that was established in Connecticut more than a dozen years ago represented an expenditure, all told, of close to thirty-five thousand dollars. The setting up and operating of a handmade-paper mill should not be undertaken without long experience and the same careful planning that would be given to the establishment of any modern industry.

For experimenting in the use of various fibres, if only test sheets are required, a small ten- to twenty-pound beater, a miniature vat, and a small mould are most useful; in the laboratories of large machine mills such equipment is usual. As previously outlined, it is not possible to manufacture usable paper by employing small, home-made appliances. The making of paper in limited dimensions at a small vat enables the amateur to study fibre formation, and much can be gleaned about paper and watermarking through working in this limited manner. Such procedure, however, has but little relationship to real papermaking by hand with large moulds and proper equipment.\footnote{1}

XVI

Handmade Papers vs. Machine-made Papers

PAPER MADE BY THE ANCIENT TRADITIONAL METHODS STILL HAS A LIMITED USE, BUT THE PAPER-MACHINE HAS ALTERED EVERY PHASE OF LIFE.

A great deal has been written relative to the merits of handmade paper formed in individual sheets in hand-moulds as compared with paper made on a machine in a continuous web. We are led to believe that paper shaken by hand in a mould will endure for a much longer period than that formed on the travelling wire of a paper-machine. This assumption is no doubt based on the fact that the oldest existing papers are handmade — the machine is a comparatively recent invention. If a paper-machine could be furnished with exactly the same stock, or pulp, that is used in making paper by hand, there is no reason why the machine-made product would not last as long as that formed in a hand-mould. It is seldom, however, that such a “furnish” is the case. The maceration of rags in handmade mills is usually accomplished in smaller beaters and with infinitely more care than in the machine mills. But, what is more important, the handmade-paper workers are not so inclined to use chemicals in their paper stock, while many machine-made papers are overcharged with bleach and other chemical admixtures that are employed for quick and cheap operation. The preparation of the paper stock rather than the method employed in its formation influences the life and durability of the paper, be it by hand or by machine. Owing to the use of poor raw materials and chemicals, some of the handmade papers produced in Italy will last no longer than much of the mediocre paper fabricated in America on machines. Indeed, it is questionable if many of the so-called “all-rag” papers will endure for the hundreds of years.
that are expected of them. In laboratory testing it is doubtful whether it is possible to emulate artificially the effects of time on paper. The only real time test that can absolutely be relied upon is the actual endurance of paper through the centuries. No matter how superior papermaking fibres may be in their original state, the material may be ruined before being made into paper by the use of fibre-destroying chemicals. This detriment is not evident immediately, but makes itself known only after the paper has been in existence for many years.

If paper of genuine permanence is desired, it is necessary to imitate as closely as possible the ancient methods of fabrication, for only in this manner is there assurance that the paper will endure. No more durable paper of the European type has ever been made than that used in printing the Gutenberg forty-two-line Bible of 1450–5. This paper has definitely lasted for five hundred years, and from all appearances it will remain in this unchanged condition for hundreds of years to come. We are not satisfied to make paper by these old methods, even though we are convinced that only paper made in this same tedious manner, without the aid of chemicals, will endure for countless centuries. It is admitted that modern paper produced on the machine is far more perfect in formation and in mechanical development than the paper made by hand in the fifteenth century, but the endurance and lasting quality of present-day paper are often sacrificed for speed of production.

A number of years ago I attempted to produce handmade paper commercially by using the same methods employed by the papermakers of the incunabula period. The finest rags were gathered, no chemicals were introduced, the beating was executed with care, and the sheets were formed separately in hand-moulds; the drying and finishing were undertaken with assiduous caution. Apparently, however, there was no demand for paper of this quality and the mill was forced to close through lack of support. Perhaps it is a saving grace that many modern books—say nothing of magazines and newspapers—will not exist beyond a few decades. Could this be nature’s subtle way of eliminating from posterity the records of an uncouth and slipshed age?

Provided precisely the same stock is used, the greatest advantage in quality handmade paper would have over paper formed on the machine would be that the fibres of handmade paper are shaken four ways, causing them to cross and intertwine in formation. On the travelling wire of the machine the course of the fibres is limited to the side-to-side shake, which has a tendency to throw the fibrous material in one direction only. For this reason paper formed on the machine has a “grain” and tears more easily one way than the other, while handmade sheets will tear with almost the same resistance in all directions. Also, in handmade paper the individual sheets are allowed to shrink naturally, but with machine-made paper the artificial drying on heated cylinders produces paper that has not been permitted natural shrinkage.

The machine-made thing may always be more perfect technically and mechanically than that made by the hand of man. With the present-day glorification of the handmade thing, however, it would seem that there were but few hands and fingers left in the world, while in reality there are more than ever before. The difficulty is that workers are not trained in the hand crafts—an absolute necessity before the advent of the machine. I have long been an advocate of hand work and have consistently tried to carry out my convictions, but I am well aware that there are many instances where the handmade thing has been discordantly employed, and printing is no exception. The use of handmade paper in book-printing is perfectly proper when all materials and methods are in accord with it, but does it not seem an anachronism to print a volume on handmade paper when the text of the book has been composed on the Linotype or Monotype? The type-setting and type-casting machines are marvellous inventions, and so is the paper-machine with its production of miles and miles of paper of an even thickness and weight. If handmade paper is to be used consistently in book-printing, the type should rightfully be hand-cut, hand-cast, and hand-set, and the printing executed on a hand press. Handmade paper is too often used for an “effect,” an endeavour to gain a certain superficial aristocratic veneer that has no right to exist. If the mechanical type-setting machine can take the place of punch-cutting by hand, matrix-adjusting, and hand casting, then the paper-machine should be looked to for the paper, if there is a sincere desire for harmony and consistency. No matter how perfectly a book may be designed and printed, it will always be incongruous if the modern machine and the old hand
methods are forced to form a partnership. The two distinctly different schools of production will not blend.

Since the invention of papermaking in the second century after Christ, workers in this craft have had to contend with mechanical imperfections due to the construction of the hand-mould and the limitations of human skill. Most pronounced among these imperfections were the deckle edges caused by the moist fibrous pulp running against the boundary frame, or wooden deckle, of the mould. The Oriental papermakers cut away these rough edges, leaving a clear-cut edge on each of the four sides of the sheet. In Europe also during the early centuries of book-printing the deckle edges were eliminated in many cases. The rough edges were regarded as blemishes in the making of the paper and therefore were discarded. It was not until the beginning of the machine age that deckle edges on paper began to be considered artistic and desirable. At the present time probably more handmade paper is sold on account of the deckle — or uneven — edges than for any other single characteristic. As a matter of fact, if the four deckle edges were cut away, it is doubtful if there are a half dozen printers or bibliophiles in America who could distinguish handmade paper from that made on a machine. During the early years of printing in Europe the deckle edges on paper were looked upon with disdain. Now these same rough edges are the label of respectability and recall to mind private presses, limited editions, and all manner of book snobbery. It is doubly offensive, however, to see deckle edges on the four sides of paper that has been formed on a machine, for here we have the deliberate imitation of an imperfection! There have even been machines invented to put mechanical “deckle” edges on cheap paper by means of a rotating cutting device, and a New York firm was at one time listed as doing artificial “deckling” for the trade. The deckle edges on paper could be compared to the selvage on cloth — something that is essential in fabrication, but a defect that should be hidden or eliminated from the finished book or garment.

Aside from the deckle edges on genuine handmade paper, which make registration in printing difficult, unless the hand press with pin register is used, there are numerous other imperfections in handmade paper that cause difficulties to the printers who utilize paper of this kind. Probably the most annoying of these defects is a disparity of thickness in the separate sheets, as it is humanly impossible for a vatman to gauge each sheet of a ream so it will weigh exactly the same as every other sheet. In forming paper in a hand-mould, the worker has only his sense of weight and balance to guide him, and the thickness of each individual sheet of paper depends entirely upon the skill of the craftsman. It would be rare indeed to find a workman who could always dip precisely the same amount of liquid pulp with his mould, for the weight of each sheet must be judged while the fibre is saturated with water. A newly formed sheet of moist rag fibre weighing several pounds might after drying weigh only as many ounces. Only a superhuman artisan could be expected to form all sheets of a ream identical in weight, but it is surprising how dextrous the vatman becomes after many years of practice. The difficulty of moulding paper, however, does not lessen the trouble and worry involved in printing upon paper that is uneven in thickness and lacking in uniformity. If one sheet of paper is thin and another heavy, there is certain to be a difference in the impression when the paper is put through the press. A far more exasperating defect, sometimes present in handmade paper, is that one portion of a single sheet is heavier than another. While this difficulty is not so common as variation in the weight of separate sheets, it is nevertheless prevalent to some extent in the finest handmade papers and the result is that undue hardship is caused the pressman when he prints upon it, either on a hand press or one operated by power. Inasmuch as the weight and thickness of handmade paper is so irregular, paper of this kind is seldom sold by weight, the tendency being to list the paper as bulking so much to the ream.

Another characteristic of handmade paper that makes for difficulty in printing is that the sheets are not always square. The moulds upon which the paper is formed are perfectly true, as well as the wooden deckle boundary rims, but it is seldom that the finished paper dries absolutely square and even at the four corners. In folding a sheet of handmade paper in the centre for a folio, it will be noticed that the four corners do not always fall one upon another, and if the top edge of a sheet be brought in perfect alignment in folding, it is likely that the watermarked "chainlines" will not be absolutely perpendicular. While this lack of squareness may not be offensive from an aesthetic viewpoint, it
does, nevertheless, give both the printer and the bookbinder considerable annoyance. The technical faults of not being truly square, along with the rough deckles and uneven thickness of handmade paper, are conditions that have always been present in paper of this kind and it is not likely that they will be overcome.

With all the various uncontrollable imperfections that are present in handmade paper, there is a particular fascination about the product that makes it desirable and suitable for the printing of certain books, but paper of this kind should not be used indiscriminately, without regard for its traditions. In many instances where handmade paper has been used in an endeavour of the printer to acquire “class,” it would have been far more appropriate to have used a well-made machine paper. Even among the leading book-designers and typographers it is sometimes amazing to see the lack of knowledge displayed in the selection of paper for specific work. It is not unusual to find books of the highest workmanship and scholarly attainment printed on paper that is totally unsuited to the work in hand. The makers of machine-made paper have made decided aesthetic progress during the past decade and many pleasing tones and finishes have been devised. The greatest fault of the makers of machine-made papers is perhaps their endeavour to imitate certain elusive qualities that only handmade papers rightly possess. The machine should be confined to its legitimate work and not be forced to make artificial deckle edges, imitation “laid” and “chain-lines,” and antique finishes. This is an outright confession of the machine’s limitations in the creation of what is commonly considered artistic value, and an acknowledgment that the technical blemishes and imperfections of genuine handmade paper are highly desirable from a selling standpoint. Papers made by hand have qualities that are peculiar to this type of paper; machine-made papers possess qualities that are not possible to duplicate by the old hand methods; the two products are distinctive and one should not be an imitation of the other.

Book-printers too often regard paper as simply a necessary background for their type and composition, very much as a painter looks upon his canvas. No matter how beautiful the typography of a book may be, if the paper is not in keeping with the complete scheme of design and purpose, the undertaking loses much of its real value. This does not mean that all handmade paper is suitable for all fine work — indeed, many books have suffered because handmade paper was used. Moreover, as outlined at the beginning of this chapter, the fact that paper is handmade does not necessarily mean that the product is lasting and enduring, and therefore suited for fine printing. In some parts of Europe, especially Italy, good papermaking materials are exceedingly expensive, while labour is exceedingly cheap — an economic condition that brings forth hand work with inferior material. Finer papermaking rags are to be had in America than in almost any other part of the world, and the machine-made-paper mills of the United States have this advantage over even the European handmade-paper mills. Workmen from European handmade-paper concerns, upon seeing the fine American rags, have expressed themselves forcibly on the excellence of the material and have stated that they never previously encountered such superior quality.

For the general run of fine bookmaking, much of the imported handmade paper from Europe is sized too heavily and gives considerable difficulty in dry printing. For damp printing the sizing does not matter to such an extent, as the tough resistance of the paper’s surface is reduced considerably by the humidity. In printing dry, hard-sized handmade paper on a hand press, it would not be an exaggeration to say that almost twice as much ink would be consumed as in printing the same paper after it had been dampened.

The Chinese and Japanese papers made of mulberry, mitsumata, and gampi barks all have beautiful printing qualities and embody characteristics that make them admirable for wood-blocks, etchings, photogravures, and so on. These papers, when free from foreign wood pulps and chemicals, are just as enduring as any rag papers of the Occident; in fact, paper made from pure mulberry bark and hemp fibre has remained in perfect condition for over fifteen hundred years. Papers made from unadulterated mitsumata and gampi barks seem almost to improve with age, specimens several hundred years old retaining their original freshness and giving the appearance of being able to endure for all time. Owing to the nature of the fibres, the handmade papers of China and Japan are not suited to the Occidental form of writing, but their printing possibilities are various. The most serious objection to many of the Oriental papers is that their surface be-
comes rubbed more readily than that of papers made in the European manner from linen and cotton rags.

It is always difficult to decide upon the proper paper for a specific book or piece of printing and there are no set rules to follow precisely. The decision should rest largely upon the typography of the book and the purpose of the volume. Both handmade and machine-made papers have their places in modern printing, and the typographical designer should study carefully the utilitarian and artistic requirements of a book before the final selection of the paper. While handmade paper from a reliable mill may be stronger and more durable than any paper made on a machine, it would not be practical to use it to any extent in modern book work. Handmade paper should never be used merely for its appearance of luxury and splendour, without any thought as to its artistic appropriateness or requirements from a utilitarian point of view.

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