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**WHAT A  
STATIONER & PRINTER  
OUGHT TO KNOW  
ABOUT PAPER**

BY  
**HARRY A. MADDOX**

**SECOND EDITION**

LONDON :  
**J. WHITAKER & SONS, LTD.**  
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Fernando Peres



WHAT A STATIONER AND PRINTER  
OUGHT TO KNOW ABOUT PAPER.



What a Stationer and  
Printer ought to know  
about Paper.

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## PREFACE

### TO THE SECOND EDITION.

The purpose of this work is to put before those who handle paper the information that is essential to an efficient understanding of the various classes in popular use. Many excellent books have been written about paper, but the majority do not efficiently meet the desires of the stationer and printer.

It is almost impossible, and certainly not necessary, that those who use or sell paper should commence their calling with a mill experience. The variety of types and classes of paper daily handled, valued, judged or matched, embodies the product of many totally different sorts of mills. Hence, a detailed description of paper-making (such as forms the meat of most paper text books) or a course of mill tuition, would be useful only to a very limited extent.

What the stationer, printer, or paper user wants, and what the following chapters aim at supplying, is a sound knowledge of the peculiarities, features of distinction, and points on which to base identification and judgment, of the different classes of paper which come his way.

As a foundation for the reasoned assimilation of further knowledge affecting these classes of paper, the outlines of manufacture as far as necessary are embodied in each chapter.

Several new chapters have been introduced and the information brought up to date throughout.

H. A. M.

Manchester.

January, 1919.

# CONTENTS.

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	PAGE
Modern Printing Papers   ...   ...   ...   ...	9
Account Book Papers       ...   ...   ...   ...	14
Hand-mades           ...   ...   ...   ...   ...	24
Mould-mades and Imitation Hand-mades   ...	34
Carbons       ...   ...   ...   ...   ...   ...	39
Manifold Papers       ...   ...   ...   ...   ...	45
Blottings   ...   ...   ...   ...   ...   ...	49
Wrapping Papers       ...   ...   ...   ...   ...	55
Specialities in Paper ...   ...   ...   ...   ...	61
Indexing and Filing Cards, Folders, &c.   ...	66
Boards for Card Index Systems, &c.   ...   ...	72
Business and Visiting Cards       ...   ...   ...	77
Stock-keeping and Recording   ...   ...   ...	83

# What a Stationer and Printer ought to know about Paper.

## CHAPTER I.

### MODERN PRINTING PAPERS.

Modern printing papers are of so many types and varieties, that familiar knowledge of all the grades is not a common acquisition. Yet it is desirable that the printer should be able to pass judgment upon the majority of the classes of paper with which his business may bring him in contact. The points of judgment which under practical conditions are most requisite would appear to comprise general quality, suitability for purpose, efficiency of condition and price.

General quality refers to the colour, texture, finish, and strength of the paper. Suitability for purpose concerns the character of the paper in relation to the class of work to be undertaken. Efficiency of condition applies to maturity, freedom from damp, flaws, bad edges, and in the case of art papers to the condition of the coating. Price speaks for itself, but to judge the value of paper to an eighth of a penny calls for a considerable amount of knowledge and experience.

Of printing papers in general it may be said that the essential difference between them and writing or book papers is in the sizing and finishing treatment accorded during manufacture. In other respects the mode of production may be much the same, unless a cheap printing paper be compared against a high class writing paper in which event the choice of material and method of manufacture would differ considerably. As the scale of quality is ascended, in the case of writing papers, the degree of strength advances correspondingly. In regard to printing papers strength is not a prime factor and the improvement of quality synchronizes rather with a higher degree of fitness and appearance.



Esparto is held to be the ideal type of material for the manufacture of mellow book-printing paper or for the preparation of the body stock which by a coating of clay and glue solution is converted into polished art paper for half-tone or three-colour process work. Yet esparto is one of the shortest of fibres and notably lacks the power of introducing the strength element.

Evidently, therefore, a somewhat different viewpoint must be taken in the examination of printing papers than is usually adopted in passing judgment upon all other grades.

With this reservation, some regard may now be paid to the characteristics of the various types of printing paper, prefacing these remarks with a brief outline of the mode of manufacture of printing papers in general. Taking esparto (a tall grass plant from Spain and North Africa) as the type of material employed, the grass is received in bales, which are opened, spread apart and passed through a dusting apparatus, where sand and dirt is removed. From this machine the material is passed along a travelling belt, by which girls are stationed for the purpose of picking out root ends and foreign matter. The partly cleansed esparto is then charged into an upright kier, or boiler, and boiled for several hours in a solution of caustic soda, heated by steam pressure and constantly agitated. On the completion of the boiling process the material is washed, drained and discharged from the kier. The next step toward the reduction of the mass to pulp consists in partial maceration in the breaking engine, a large rectangular vessel with rounded ends and a partition down the centre, dividing the breaker into two channels. In one of these is fitted a revolving cylinder with knife blades round its surface and a bedplate of corresponding knives, while in the other channel is a cylindrical drum covered with fine mesh wire and fitted inside with a syphon arrangement for removing dirty water. The material in the breaking engine is covered with water and the motion of the



revolving cylinders forces the mass round the channels. On one side the knives rend the material and on the other the dirty water is removed. Thus the material is reduced to half stuff, i.e., a clean and pulpy condition. Bleaching follows and in the case of esparto, the half-stuff is converted into a rough sort of sheet by running over the presse pâte, an elementary type of paper machine. Subsequently, the half-stuff is further reduced to pulp in the beating engine, which has many points in common with the breaking engine. At this stage the loading, sizing and colouring matter is added to the pulp and the latter is then in a condition to be converted into a continuous web on the papermaking machine. Subsequent operations include calendering, finishing, slitting, sorting and packing, &c.

Though rough and incomplete, the foregoing may afford some idea of the mode of producing printing paper. The finishing end is important, for according to the type of surface produced, the paper becomes more or less suitable for the purposes for which it is required. Taking a general survey of the subject, it may be said that ordinary machine or mill finish fits a paper for book-printing without illustrations so long as the paper is sufficiently stout and full bodied to produce opacity in the sheet. Super-calendering imparts a smooth surface, especially suitable for line-block printing, small type and coarse half-tone plates. For better effects and easier printing aptitude, the class of stock termed imitation art would be more efficient, though as a paper it may be considered a lower grade on account of the volume of clay or loading which is added to the pulp for the purpose of securing a smooth and even sheet. It is remarkable to note, in the case of typographic illustration, that the higher the quality and effect desired in the blocks and printing, the lower is the real value of the paper chosen. It must again be observed however, that as value of paper is more apparent than real and as the question of efficiency for

its purpose decides the merit of the stock, it is only from the stand-point of the idealist that the contention may be made of a diminishing standard in paper quality coincident with the raising of the typographic or illustrative standard. From machine finished paper to super-calendered marks the first retrograde step, for the process of calendering crushes the paper and destroys colour, while imparting a false surface which, apart from facilitating printing has no other virtue. The addition of heavy loading and the crushing of the fibre which are essential to the production of imitation art paper mark the second step in the deterioration of paper, while in the distribution of a clay surface on a fibre body, as in the production of art paper, we have the third and final step. Coated art paper is, however, a necessity if we are to have fine illustrations and colour work on a cheap and plentiful scale. Doubtless in time photography and offset methods will solve the problem of cheap and efficient production, but until then coated art stock must hold its favoured place.

Each grade of printing paper has its own appointed sphere and if the printer knows the nature of his work he knows also the class of paper required. It then becomes a matter of judgment as to the precise value and quality of the particular class of paper handled for the work. Taking machine finished paper, each rise in the scale of price should correspond with a purer colour, cleaner look-through, firmer feel, and better substance. Standard of colour is a difficult thing to determine, but comparison of a good make against, say, common news print, will reveal a very wide difference of margin in colour, though both may generally be called white. The poorer qualities of printing paper contain a more or less large proportion of mechanical wood pulp. The effect of this constituent speedily becomes visible on exposure to the atmosphere, for the resin and organic impurity of the wood itself is embodied in the pulp. Paper which includes such material in its composition

can never be cleanly made, hence it is not difficult to detect M.W.P. impurity by the dirty lookthrough of a sheet held up to light. The treatment of the paper during manufacture is clearly reflected by the degree of whiteness attained in the finished sheet, for if washing is hurriedly performed, or if bleaching is restricted in time and quantity the colour suffers.

Super-calendered paper may be judged on the same basis, with special reference to the presence of dark stains and specks which are often the accompaniment of heavy rolling pressure or low grade paper. It is characteristic of the S.C. that it brings into greater evidence the foreign particles and reveals the presence of impurity, which might otherwise lie hidden in the body of the stock.

Art paper, or coated art as it is termed, is most difficult to judge correctly, the best test being a practical trial on the press. As this is rarely possible, some guiding principles may be outlined. A keen perusal of the surface may reveal gritty particles, bits of enamel, cracks or kinks, curved or wavy edges, the occurrence of any of which will directly lead to bad printing and even injury to plates.

Frequently, an objectionable odour is noticeable, especially on freshly made art paper. This is due to the use of bad glue in the preparation of the coating solution. Though it may be without undue influence on printing quality, the presence of such a smell is sufficient evidence on which to condemn a paper.

Good coated paper should show no wiremarks; if present, they may be taken to denote a spongy body stock or a very weak coating of enamel.

It is always advisable to examine the firmness of the coating, for almost all the troubles in printing half-tone blocks arise from what is known variously as lifting, peeling, plucking or picking. New stock is a frequent source of trouble through this defect. At other times it is caused by excess of clay over glue in the prepara-



tion of the enamel, or by storing art paper in a damp room.

Useful methods of testing the surface firmness are: (1) Moisten the ball of the thumb and press heavily upon the paper. A high grade coating will not yield, whereas weakly held enamel adheres to the thumb. (2) Rub a sample between the forefingers and thumbs, and note the extent to which powdering takes place.

To distinguish real from imitation art rub with a silver coin, which produces a black mark on the former and none on the latter.

## CHAPTER II.

### ACCOUNT BOOK PAPERS.

Account book papers cover a wide range, extending from engine-sized azure laid to tub-sized air or loft-dried, and the highest class hand-made. Necessarily there are many thousands of different classes of stock produced within this range, designed with particular objects in view. Apart from the fashion as to shade, finish, &c., which are matters hardly affecting the price, the class of account book paper is, or should be, chosen in order to be appropriate for the particular function which it will afterwards be called upon to perform. The amount of wear and tear which it will have to withstand determines the strength and purity of fibre, which are the factors that ultimately control the price. Certain classes of books, which require to be but short lived, and never again brought into use for reference, call for a paper, the essential quality of which should be comparative cheapness. On the other hand, other account books are required which are destined to receive the most careful usage, and but rarely brought into use, whilst at the same time the life must extend over a prolonged and probably indefinite period. The main characteristic of the paper composing such a book would be permanence, obtained by purity of fibre, colouring matter, sizing and other constituents.



## THE MANUFACTURE AND THE QUALITY.

The questions before us are:—What is it that constitutes quality in an account book paper, and by what means are the grades produced as we rise step by step in the price per lb. ? The prime factors are, the raw material and the method of treatment of same. According to the structure and properties of the fibre, the ultimate quality largely depends. Esparto is used in the cheap, bulky azure laid, engine-sized, account book papers, and gives mellowness and finish but lacks strength. Chemical wood-pulp is used largely nowadays and can be modified in treatment to imitate many other fibres. A strong paper is produced, inferior to rag paper in permanence, especially when a good colour is essential; nevertheless, wood may be said to be present in practically all account book papers of the cheaper class. In the better grades a predominance of rag fibre should be expected. For permanence and quality in every way, cotton and linen are pre-eminent, and of these two, linen is the more expensive and is superior in strength. The various grades of rag papers range according to the quality of rag used, whether white or coloured, old or new cuttings, &c.; all of which factors influence the operations during manufacture, some requiring more stringent treatment with consequent lowering of quality of product.

One of the most important considerations in an azure, or yellow laid paper, is the colour, not so much its shade as its property of permanence. Most stationers are conversant with the fading which occurs amongst older remnants of stock. In the cheaper qualities, unstable, low priced colouring matter is introduced, as fugitive coal tar dyes, and the lowest grades of ultramarine; the middle class papers are mostly dyed with higher quality ultramarine, which cannot claim permanence of shade. Even the better papers with higher quality ultramarine are apt to contain chemical residues such as bleach, antichlor, free acid, alum, &c., which in course of time

aided by sunlight and heat deteriorate the colour. With pure rag fibre and high grade blue the permanence is high, but not to be compared with the class of mineral colour known as smalts, used in hand-made and imitation hand-made ledger stock. Here we arrive at the pitch of perfection.

To sum up therefore:—The gradation in price per lb. of machine-made account book papers corresponds to the selection of raw fibre and its state of cleanliness, which determines a mild boiling with weak alkali and a non-injurious process, or a vigorous treatment with strong alkali and consequent tendering of material in some degree. In like manner, the washing affects the price, according to whether it is copious and well conducted—the breaking and beating as to whether a contracted or prolonged process, upon which depends entirely the ultimate structure of the fibre as prepared for paper. Further, upon the latter depend the felting properties, which in the end control the strength of sheet. In the beating engine the colouring and sizing processes are conducted, the factors controlling the price of the ultimate product being the quality of the chemicals and the character and duration of treatment. After the passage through machine, the drying and tub-sizing are effected in a manner and grade harmonizing with the prior quality of material and treatment.

#### CARE IN STOCK-KEEPING.

To depart from this brief discourse on manufacture, the knowledge of which is essential in order to grasp and understand the reasons which make for variation in grade, the question of account book papers from the point of view of actual use may be considered. The principal concern of the stationer, prior to the conversion of the paper into books, is to stock in the most approved manner. Remnants are plentiful in this class of stock, and much waste is occasioned by improper storage. Remnants should not be re-placed into stock

unless so packed as to exclude dust, and so tied as to avoid being marked by string or tape. The original wrapper, which serves as a means of identification without a reference to the marking, should not be discarded unless necessary for the neatness of aspect. There is every inducement to regard the last two or three sheets of a ream, when remaining over after serving out an order, as waste. In the course of a year, this class of wastage, which should never occur, accounts for the loss of a considerable amount of paper. Such sheets, if unmarked, ought to be put back into stock, but if marked by string or tape, should be preserved for use as account book end papers. If dirty, or badly impressed, they should be retained for use as waste sheets in the bindery, thus saving other and probably more valuable stock. Racks for account book papers should be solid shelved, and never contain cross-ribs, the impression of which strikes through a number of bottom sheets. If, however, the shelves are faultily so constructed, waste straw or millboards will remedy the defect.

#### RETREE.

The right observance of the use of retree is a matter of importance, the misuse of this grade having been responsible for much trouble between account book makers and clients. A particular person does not care to have spotty leaves in his ledgers, and if by any chance retree has been drawn upon, it is certain that flaws will exist throughout the book. Every sheet in a retree ream is defective; if it were not marked in some way it would take its place in a perfect ream. Retree should be stored with distinctive marking and price, while brokes, if such are kept, being unfit for ordinary usage, should be separated from good or retree.

#### HOW TO JUDGE A PAPER.

It is a common failing of stationers to depend almost entirely upon watermarks when identifying a paper. To



become a judge of paper the inherent qualities and characteristics of the various qualities should be well studied, for many cases occur in which a sample to be matched lacks the watermark. The look-through, tear, rattle, finish, shade and feel, are the properties by which the quality and make are identified. Allowance must be made at all times for variations in shade which may occur between two makings of the same paper, for it is almost impossible under practical conditions of paper-making to always produce an absolutely perfect replica of shade. The rattle and tear of a paper is apt to be misleading when a new making is compared with older stock, the latter possessing a brisker feel and tear. The former has not had sufficient exposure to normal conditions of temperature and atmospheric humidity. The gelatine used in the tub-sizing also requires a space of time in which to assume a normal condition, under which it contains about 17 per cent. of moisture. In judging strength by tear, it must further be remembered that the strength of a sheet varies crossway from length, to the extent of about 25 per cent. This is due to the characteristic lay of the fibres in the sheet, occasioned by the rapid flow of the pulp on to the machine wire, accompanied at the same time by a sharp lateral shake. These two factors combine to induce the majority of fibres to assume positions somewhat analogous to the flow. In this direction therefore the account book paper will be the stronger. The methods by which the machine and cross-ways of a paper may be determined were described in the previous chapter, in addition to which, the mere tearing of a sheet shows a preponderance of projecting fibre when it takes place across the sheet. Too much importance must not be assigned to a rough tearing test; the true standard is not the tearing, but the breaking strain, which determines the quality of the felting or intertwining and ultimate strength of fibre. For everyday quick handling and comparison of papers, however, the tearing strain may



with experience prove quite efficient, provided always that both ways of the sheet are examined and a tension as nearly equal as possible always applied.

### THE SIZING.

A most necessary qualification of account book papers is that they should be well fitted to take writing ink. The sizing is all important; if there is a superabundance of gelatine, i.e., if the film of tub-size is too thick, the ink rolls up in pearls. This happens with hand-made papers particularly, the surface acting as though it were greased. Too high a finish on a paper results sometimes in a polish which acts in much the same way towards writing fluid as does an excess of gelatinous size. In contradistinction to the repulsion of ink in an oversized paper, is the absorbency of an undersized sheet. Too scanty a film, or too weak a size, allows the ink to penetrate through the interstices between the fibres and even find its way up the centre canals of the fibres themselves. Thus the fluid speedily runs right through, from the upper to the lower surface of the sheet. All account book papers contain a certain percentage of resin size, the lower qualities carrying a much larger proportion than the higher grades, for cheapness sake. Thus, peculiarly enough, the lower class stock is better fitted to withstand the penetration of ink, supposing the tub-sizing to be faulty. The most practical method of testing sizing capacity, and the one carried out in many mills, is to roughly scrawl with a quill or broad pen-nib, a series of four lines, at angles, as for noughts and crosses. The manner in which the sheet withstands the ink at the junctions of the lines, determines the efficiency or otherwise, of the sheet.

### WIRE MARKS.

Equally important from the point of view of writing efficiency is the comparison between sides of the sheet. It is extremely annoying to turn from a well finished, or

even surface, over which the pen glides smoothly, to a rough wire-marked underside, over which the pen drags and catches. This trouble is of frequent occurrence owing to faulty manufacture and inefficient rolling of the paper. The marks of the machine wire are apparent on almost all papers, but not in such a manner as to interfere with the function of the sheet for writing purposes. New stock should always be examined for finish, held level with the eye, facing a good light. If the pores or pits appear well defined and distinct, whilst the price and quality of the paper rank high, there is ground enough for rejection, owing to the defect. It must further be remembered that before writing fluid is applied to the sheets they must encounter the ruling machine, with consequent broken lines upon the rough side, unless the difference in finish is noted and fresh ink regulated accordingly.

The trade expressions or terms usually applied to account book stock, although in everyday use, are but imperfectly understood by the majority of stationers. Such terms are often coupled up with the brand or quality of certain makes, and are commonly expressed as part of the name, as, for instance, "Tub-sized, or Animal tub-sized—," "So-and-so Mould-made," or "E. S. A. L—."

We will endeavour, therefore, to state in simple language the meanings of these various trade terms, at the same time imparting such knowledge as may help the reader in deciding whether such papers as may come under his observation have been subjected to the processes from which the terms are derived.

#### THE TRADE TERMS.

Wove and Laid are the most familiar terms used in connection with paper, denoting as they do the general structure of the sheet in the look-through. Laid is applied to such papers as show parallel watermarkings down the sheet, about an inch apart, crossed at right

angles by close waterlines running parallel to each other, perhaps twelve to the inch. Wove papers show an even texture in the look-through, free from any decisive water-markings except the name of the paper. Whether for laid or wove, the preparation of the pulp and its manipulation upon machine does not differ, except so far as the changing of what is called the dandy roll is concerned. This latter is a wire-covered cylinder, which fits across the width of the papermaking machine and revolves and impresses its design lightly upon the surface of the travelling moist pulp. For wove paper, the covering of the dandy is a closely-woven, even-textured wire, whilst for laid paper it is built up of close parallel wires, laid across circumferential ribs of wire about an inch apart. In either case, whether laid or wove, the travelling wire of the machine, which actually carries the pulp along, is always of the wove pattern; this accounts for the traces of wove pattern which occur on the under-side of nearly all account book papers.

Generally speaking, account book papers have always been laid, rarely woven.\* The shade imparted to such stock is blueish and is termed yellow-laid, or, in the case of hand-mades, blue-laid. The designation "azure-laid" is oftentimes employed, but is erroneous, the term azure being correctly applied to wove papers only. However, wholesale stationers have multiplied the terms to suit themselves, and we now have A.L. azure-laid, A.W. azure-wove, Y.L. and Y.W. denoting yellow-laid or wove; B.L., in the case of handmades only, denotes practically the same shade as A. or Y., i.e., azure or yellow. In the case of a machine-paper the term B.L. or B.W. would indicate a deep blue shade, such as is extensively employed in legal and official work.

#### ENGINE AND TUB-SIZED PAPERS.

Account book papers are often described as T.S. (sometimes A.T.S.) or E.S. which terms indicate that

\* There is now a decided tendency toward the adoption of wove account book papers especially in loose-leaf systems. Common sense and progress dictate this desirable development.



the paper is tub-sized, animal tub-sized, or engine-sized, the two former being synonymous. The terms carry their own meaning fairly well, indicating that the sizing of the paper, to render it impervious to writing fluid, has taken place in either engine or tub, according to the particular term applied. It would be well to state that whereas most manufacturers of other goods describe their plant as machines, the papermaker, except in the case of the paper machine itself, prefers to use the word engine. In the particular case in hand, the engine-sizing takes place in the beating engine, i.e., whilst the pulp is in a liquid state preparatory to making the web of paper. On the other hand, the tub-sizing is performed upon the finished web of paper. There is thus a wholesale distinction between the two forms of sizing, rendering the use of entirely different sizing material imperative, whilst the mode of procedure is responsible for the high price of T.S. as compared against E.S. papers. The term A.T.S. or animal tub-sized proceeds a stage further than T.S. and informs us vaguely concerning the source of this form of size. It is in fact a type of gelatine or glue, obtained from the hides, horns, trotters, hoofs, clippings, &c., of cattle, by repeated boiling and clarifying. The completed web of paper passes through a vat, or tub, containing a certain strength of this sizing liquor, by which means a film is imparted to the paper surface, whilst a certain proportion is absorbed. Where a particular grade of stock is termed "tub-sized by hand," it is understood that the web of paper has been cut down to single sheets, which have then received a more thorough and careful sizing by being plunged into the trough, so many sheets at a time. The reason for the cheapness of engine-sized account book papers will be observed from the fact that the costly gelatine and the extra time involved in the slow tub-sizing process are dispensed with, consequent upon which the sizing capacity is of a different nature. As distinct from an animal product, a vege-

table matter is made use of in engine-sizing, namely, resin, finely powdered and compounded into the form of a soap or resinate. This is added to the pulp and after a thorough admixture, an alum solution is poured in, which splits the resin into minute invisible particles. Thus the fibres embodied in the pulp become coated both inside and out with a film impervious to writing ink, in degree according to the efficiency of the sizing. It may further be noted, as an important factor in the process, that the heat of the ensuing drying calenders is said to fuse the resin film upon the upper and lower surfaces of the sheet.

We should naturally expect after surveying the properties of resin and glue, that the difference in feel of a tub-sized paper against engine-sized would be very marked. This is the fact, and largely by this means the two classes of sizing may be identified with comparative certainty. An account book paper which rattles well and tears with a certain crispness (not brittleness), is almost certain to be T.S. Resin-sized stock handles somewhat bulky, is more mellow in feel and tears with softness. Of course, as we may expect, the tub-sizing adds to the strength, whilst an efficient tub-sized sheet will stand erasure and re-writing upon much better than the best engine-sized. When E.S. papers are used for account books the leaves rapidly become limp and disfigured by frequent handling.

#### METHOD OF DRYING PAPER.

The methods of drying paper vary according to the grade or quality, and sometimes give rise to the coupling of a term to the brand, indicative of the process by which it has been brought to a normal condition of dryness. Such terms in constant use are air-dried, and loft-dried, whilst the everyday drying process is not specially designated. Therefore, it may generally be taken for granted that where an average price tub-sized paper is not described as having been dried by any

particular method, it has been dried by the common method of passing over heated cylinders. Air-drying is performed by passing the sized web of paper over skeleton drums or cylinders, in which air fans revolve. Graduated heating is introduced according to the necessity. It may be remarked that a minimum of heat, provided it is efficient in its function, makes a better sized paper. Loft-drying is the most costly method, but it produces the finest character of stock, for a perfectly natural sizing and drying is ensured. Sheets of paper only (not the reel, or web), can be sized and dried by this means; consequently, the designation of such stock is "tub-sized by hand, loft-dried." This term is only encountered in the highest quality of account book papers; we may therefore view it as a guarantee of the best production.

Generally speaking, machine-dried papers handle more brittle than air-dried, whilst loft-dried partake largely of the character of hand-made papers, in that they possess great strength and feel compact, in no way brittle, yet rattle well. The loft-drying process comprises exposing the sheets to a carefully regulated temperature for a considerable period, hung over cowhair ropes. Often enough, paper which has been loft-dried is easily detected in the ream, from the fact that when placed upon a flat surface, it shows a rise in the centre, corresponding to the bend of the sheets as they originally hung over the ropes.

### CHAPTER III.

#### HAND-MADES

Little over one hundred years ago machine-made paper was an unknown commodity, the Fourdrinier, which was the first paper-making machine, being introduced in 1803. Now, however, hand-made paper is regarded as somewhat of a luxury, and forms but a very small percentage of the total amount of paper consumed annually. It must be by no means considered



that hand-made papers have died out, or that they are in the least likely to do so, for there is a well sustained demand for them amongst high class and well established houses.

#### METHOD OF MANUFACTURE.

As to the actual production of hand-made papers, perhaps the most remarkable thing is the fact that they are made at the present time by practically the same procedure and identical methods as they were hundreds of years ago. A brief description of the process as carried out at the foremost English mills may be of interest, and will at the same time explain the presence of certain inherent peculiarities in this class of paper.

One of the most important factors in the production of high grade paper is the water supply, and an examination of the situation and locality of hand-made mills up and down the country reveals the fact that they are all in possession of an unlimited quantity of clean and chemically pure water. The importance of this cannot be over-estimated, for practically everything depends upon the water supply.

#### TREATMENT OF RAGS.

Cotton and linen rags and threads constitute the raw material, grading in quality according to whether old or new, white or coloured, and the amount of impurity they contain. The rags are cut down to smaller pieces by women as a rule, although in some instances the rag-cutting engine is adopted. The highest grades of make call for hand-cutting, as a certain amount of sorting may be simultaneously performed by the women cutters. In what is termed a willow duster, the cut rags are next dusted, torn, and thoroughly ridded from solid dirt. From this engine the partly shredded rags are transferred to a boiling kier, in which they are cleansed and still further shredded by regulated boiling and agitating with caustic soda. They are then par-

tially washed and removed from the kier, after which they require to be wet-picked in order to still further remove solid impurity and foreign matter. Consequent upon this comes the washing and breaking process, accomplished in an oblong trough, provided with semi-circular ends and a partition running part way down the centre, dividing the trough lengthwise and forming a sort of channel, round which the rags and water can circulate. A roll, covered round its surface with bars or knives, helps to circulate the mass and at the same time gradually disintegrates it. Another roll covered with wire gauze removes the dirty water. Whilst in this hollander, the bleaching is performed and the rags are ultimately purified, whitened, and reduced to a pulpy state. After this treatment, the half stuff, as it is now termed, receives a further disintegration in a similar but more severe manner, in an engine resembling that used for breaking but adapted to the more stringent requirements. This process is termed beating, and by it the material is reduced to the state of fibre. Whilst here, the colouring of the pulp is accomplished, the dye-stuff for superfine account book papers being smalts. This is the finest colouring matter available and accounts for the wonderful permanence of the shade of old blue laid hand-mades. Fine or second quality papers may contain high-grade ultramarine.

#### MAKING THE SHEETS.

After being beaten sufficiently the pulp is ready for conversion into sheets. Up to this point there is no essential difference between the manufacture of hand-made or of machine-made paper. The mode of formation of the sheet of paper itself is totally different. In the one case a single sheet at a time is formed, whilst in the other an endless web is produced, which furthermore is oftentimes sized, dried and glazed in its passage through the machine.

The making of a sheet of hand-made paper in its first

stage requires the aid of a vatman and a coucher. The sheet is formed upon a mould of wire-cloth (wove or laid pattern as required), on which fits a removable frame called the deckle. By a dexterous movement the vatman dips his mould with deckle fitted into position, into the liquid pulp (which is maintained in an agitated state in a vat immediately in front of the workman) and picks up an even film of sufficient pulp or fibre to form a sheet of known weight. Some of the pulp manages to creep under the edge of the deckle, hence the formation of a set of four rough edges and the origin of the term "deckled edge."

#### DANGERS OF SPOILING SHEETS.

Very great skill is necessary to form a perfect sheet; firstly, the angle at which the mould is dipped plays an important part, then again although the vatman continuously dips his hands and arms in the liquid, the slightest drip upon the film of pulp would ruin the sheet. Again, a divergence from the amount of pulp to be picked up (although this depends entirely upon experience alone and has no mechanical aid) creates a sheet of lighter or heavier weight, which is afterwards rejected. The slightest touch upon the surface of the web or moist pulp disfigures the sheet permanently, whilst if every sheet be not formed under precisely the same action, a difference in texture is caused which results also in rejects. Numberless other difficulties arise, all tending to the increased production of bad sheets, hence the necessity for the present constitution of "mill reams," containing as they do a certain proportion of "outsides" sheets. If a customer requires all good sheets he may obtain the same by purchasing what is known as an "insides" ream, containing perfect paper.

To return, however, to the making of the sheet; the vatman, on lifting up the mould of pulp, allows the water to drip away, a vacuum at first being created



which performs a similar function to the vacuum boxes upon a paper-making machine in draining away the surplus water. At the same time a peculiar shake is given to the mould by means of which, inter-twining or felting of the fibres is effected and strength imparted to the sheet. Here we may observe that practically equal strength may be conferred by even shaking in each direction; machine papers on the other hand can only receive a shake across the web, or width way of the machine, which results in an increased strength in the finished paper, about 25 per cent. crossway from length, the latter direction being strongest.

#### DRYING AND PRESSING THE SHEETS.

After the fibres are felted and the surplus water has departed, the deckle is removed from the mould as the latter is slid along to the coucher,, who turns it over and deposits the sheet from the wire on to a felt. In the meantime the vatman is engaged in the formation of another sheet. The coucher places a felt upon each sheet of waterleaf and proceeds until he has formed a pile of alternate sheets and felts. This pile is then subjected to powerful hydraulic pressure, by which means the water is removed, following which the pile is taken out and the felts removed. With most surprising tenacity the moist sheets adhere to the felts, the peculiar structure of the felt aided by the enormous pressure being responsible for this. Here the question of hairs on hand-made paper, an occasional cause of complaint, arises. It is most remarkable indeed that hand-made sheets are so free from hairs considering the tendency of the sheets to stick to the hairy felts. A careful peeling off of the sheet is essential; in fact it is the only possible way in which to remove it. In the mills every precaution is taken to prevent hairs getting on to the sheets; the felts are cleansed thoroughly every day, constantly renewed, and in every way specially tended. No efficient substitute is known, for there are certain properties and characteristics essential to the process

which no material but felt happens to possess. The sheets of paper alone are next pressed to help remove the felt marks and still further aid in the maturing, after which the drying of the sheets is performed. This operation is conducted in special lofts maintained under regulated atmospheric conditions. The sheets are hung in batches over cowhair ropes, any number of lines being erected, in rows along and up and down. Cowhair ropes are essential in order not to stain the paper.

#### SIZING AND FINISHING.

For a considerable time the sheets are allowed to hang, during which they are changed about somewhat to allow the inner sheets to be subjected to equal atmospheric conditions to the outer ones. Considerable shrinkage occurs in the sheets during loft-drying, resulting in a thoroughly matured, well-formed and tenacious paper. Consequent upon the drying comes the sizing, performed by very slowly passing the sheets, fanned out behind each other, through a machine containing a long vat of gelatine under which the sheets are immersed. By this means the paper is rendered impervious to the absorption of writing fluid, whilst the sheets are hardened up considerably. Another loft drying follows, after the completion of which the sheets are ready for plate glazing, which consists in placing the sheet of paper between two sheets of copper (polished) and passing a pile of such backwards and forwards under the pressure of a powerful steel roll. The sheets and plates are continually changed about to ensure perfect regularity of finish in all parts.

After sorting and throwing out defective sheets, the reams are counted up and packed ready for despatch.

The careful selection of raw materials and the stringent precautions adopted in their treatment during manufacture ensure the elimination of all impurity from the product. Without exception, all the English hand-mades are composed of the highest grades of raw

material, dyestuff, sizing agents, &c., whilst the cleansing and bleaching chemicals are of high quality. The retention of injurious residue is rendered improbable owing to the copious treatment with good water. The careful methods employed result in the high standard of permanence so closely associated with hand-made paper.

#### COMPARISON OF HAND-MADE AND MACHINE-MADE.

Although comparisons may be odious, we seem naturally driven, when discussing hand-mades, to compare their qualities with those of machine-made papers. Each grade possesses some advantages and disadvantages peculiar to itself. In the matter of strength, it is a fact that hand-made stock is practically uniform each way, i.e., narrow and broad way of the sheet. If anything, it is generally found that the narrow way is slightly superior to the broad, probably due to the greater effect of the vatman's shake in that direction. In uniformity of strength hand-mades are superior to machine-made papers, for the latter differ to the extent of 25 per cent. and even 50 per cent. in strength, machine-way from crossway, the latter being weakest. It must not be concluded from this that hand-made stock is infinitely stronger than machine-made; this may not be so, provided we make the comparison against the highest class ledger paper. A recent test of standard makes of both types of paper showed the machine paper to be superior in each direction to the hand-made. If the remarks on loft-drying, shrinkage and tub-sizing are carefully perused, it will become evident that apart from actual strength, there must be such carefully imparted maturity in hand-made stock, that the highest degree of durability and resistance to damage by prolonged handling is ensured. This renders hand-made paper essentially suitable for ledgers, which receive such severe treatment (especially the indexes) that the ordinary account book paper presents a sorry spectacle after a year's handling.



## ERASING ON HAND-MADES.

Hand-made paper offers a very fine writing surface, although the ink may dry more slowly than on many machine-made papers, owing to the extreme hardness of the sizing. The surface is so free from imperfections, and rendered so pleasant to the touch by the plate-glazing, that writing is performed with ease and speed, assuming a good appearance when dry. It is sometimes claimed as a disadvantage in hand-made papers that erasure is inconvenienced, owing to the fact that if the surface is removed there is no sizing within the body to withstand the flow of the writing fluid. Machine-made papers usually contain in their body a percentage of resin size which augments the surface film of tub-size, and prevents capillary attraction after erasure and consequent re-writing. The disadvantage to hand-made, however, is a myth, for in the first place the film of gelatine or tub-size does not wholly rest upon the surface, but penetrates to some extent into the body. It would require a deep erasure almost through the sheet to radically affect the writing efficiency. Again it will be noted that the disturbance of surface caused by erasure upon hand-made is not so pronounced as that of machine-made, resulting in less inducement to spread. If the reader will but compare the two classes of stock, he will find little reliability in the differences which are occasionally quoted as decisive tests as to whether an account book paper is machine- or hand-made.

## THE DARK SIDE OF HAND-MADE.

It will be noticed that account book papers made by hand, are without exception darker on the right side of the sheet. The right side of the sheet is the one the watermark is read from. This characteristic is somewhat peculiar, and perhaps puzzles those who do not understand its origin. The statement was made in an earlier paragraph that the blueing of the pulp is performed by smalts or high quality ultra-

marine. \* The specific gravity (or weight) of these mineral dyestuffs is much higher than the fibrous pulp, creating thereby a tendency for the blue to sink to the bottom. In the vat, agitation is kept up which prevents this occurring, but when the liquid pulp rests on the vatman's mould, the blue immediately commences to sink to the bottom. Thus in the finished sheet an increased depth of colour is observable on the side of the sheet which rested in contact with the mould wires. We may remark here that this peculiarity of a darker side is not confined to hand-mades, for obviously, with the use of like dyeing matter, the same conditions are created upon the wire of the paper-making machine. There is a distinct difference, however, inasmuch as the side which touches the wire of the machine is the wrong side, in contradistinction to hand-made procedure. As a general rule then, we find that the dark side of a hand-made paper is the right side, whereas the reverse is the case with the machine stock.

#### HAIRS ON THE SURFACE.

An occasional source of trouble with hand-made papers is the presence of hairs on the surface, remaining from contact with the felts, between which the moist pulp sheets are so powerfully pressed. The hairs of the felts are long, and the paper clings so tenaciously that some hairs are bound to be torn from the felt. Every precaution is taken to prevent the defect, and it is but rarely that the stationer is able to detect the presence of hairs on the sheet. Should he do so, he will find not the slightest difficulty in having the stock replaced, for nobody is more particular that the paper should be free from hairs than the mill people themselves.

Sometimes the complaint is raised that the surface of a hand-made paper is greasy. Perhaps the ruler is the first person to find this out, but it is a defect to which he can readily accommodate himself, by manipu-

lation of the gall and ink, or the excess of size may at some time have a tendency to obstruct the ready flow of writing ink, though sometimes it may be due to the handling of the paper by hands which are naturally greasy or moist. It will be noticed particularly that the bottom of a page, which usually is fingered most, offers to the ink a surface which causes it to roll up into little balls or pearls. Use blotting paper as a shield if this defect is usual; or if the greasiness seems to be a fault with the paper, apply a rubbing of boracic acid powder.

#### HOW TO DETECT HAND-MADE.

The stationer requires to be able readily to detect whether a paper be hand or machine made; the following comments will aid the decision. With laid papers little difficulty is encountered as a rule; it is in the case of wove paper, particularly cream, that identification is troublesome. Experience is the surest aid to decision, for it is always maintained by men who have been continually used to handling hand-made paper that there is an unnameable something in the general feel and look-through, combined with tear, which is totally dissimilar to a machine-made paper. The tear of a hand-made paper shows somewhat similar fibrous structure each way, whilst there is a quiet, strong, yet far from brittle, character in the way the fibres part company. The look-through appears fairly clear, and the laid papers are entirely free from the wove specks of a machine paper. The feel of hand-made is flexible but indicative of great strength; furthermore, although flexible, there is not the slightest suspicion of softness.

A machine-made, azure-laid, ledger paper always bears traces of the machine wire on its under side. The machine wire is of course of woven structure, hence the traces consist of minute transparent specks, observable as such when the sheet is looked through against a window or natural light. If the sheet is held horizon-



tally and level with the eyes, so that the rays of a strong sunlight pass along the wrong side of the paper, these wove marks (on a laid paper) appear as a multitude of minute pits. The wires of the hand-made mould being of the laid pattern only (for laid paper), it is obviously impossible for such specks to be shown on this class of stock. In the case of a wove paper, the detection is more difficult, but here again precisely the same method of judging may be adopted, provided there is a watermark in the sheet. Woven wire specks are apparent in the watermark of a machine-made wove paper, but totally absent from that of a hand-made. Other methods of detection of hand-made paper are better known, as for instance the presence of deckled edges, although these may be imparted to machine papers, whilst mould-made papers always bear four deckled sides. These characteristics will be more fully dealt with in the next chapter.

#### CHAPTER IV.

#### MOULD-MADES AND IMITATION HAND-MADES.

For some considerable time past there have been on the market a number of different brands of account book papers, made in close imitation of hand-made stock. They may be divided into two classes; those made on a mould by mechanical means, whereby deckled edges and other hand-made characteristics are imparted; and those made in the web on the paper-making machine in the ordinary way, but with such selection of materials, and manner of treatment, as to ensure certain qualifications originally possessed by hand-mades. Of the two types, there can be no doubt as to which is the closer imitation of the genuine commodity. Mould-mades are far and away the best, but although they gain in approximating nearer to hand-mades, the high class machine-made imitations are much superior in strength. Comparing representative high grade makes of the three

qualities of stock, i.e., hand-made, mould-made, and machine-made imitation, we find that the last named is very much the strongest. The following table is the result of recent trials, and each set of figures represents the mean of five tests to ensure accuracy.

CROSSWAY.				Breaking strength in kgms.	Percentage Elongation	Number of folds before breaking
No. 1.	Hand-made	...	...	7.98	7.03	235
No. 2.	Mould-made	...	...	8.62	4.64	305
No. 3.	Machine-made	...	...	7.95	7.56	547
LENGTHWAY						
No. 1.	Hand-made	...	...	5.99	7.96	144
No. 2.	Mould-made	...	...	7.45	6.64	254
No. 3.	Machine-made	...	...	10.34	5.15	273

It is thus seen that from a physical standpoint the machine-made imitation of hand-made paper is much superior. The mould-made imitation also shows an increased strength, but the elongation of the fibres before breaking is greater in the case of the genuine hand-made. Without going into too technical a discussion of the merits and demerits of the three grades it may be pointed out that, apart from mere strength, there are certain other qualifications which remain yet to be proved by imitation hand-mades, the chief ones being permanence and durability.

Investigations instituted by the German Government to determine whether there were any real means of deciding between imitation mould-mades and genuine hand-mades, resulted in the statement that, so far as internal characteristics were concerned, no appreciable difference was noticeable. Of external appearances sufficient technical knowledge was not forthcoming to pronounce a decision.

#### MODE OF MANUFACTURE.

A knowledge of the methods by which hand-made characteristics are imparted to the two classes of imita-

tion is very useful in helping the buyer to a better appreciation of differences which are likely to occur.

The ordinary machine-made imitation hand-made is turned out from the Fourdrinier machine in practically the same manner as an everyday account book paper would be. The selection of raw materials and their treatment during pulping follows on the same lines as for hand-made papers, although it must be stated that the ultimate price influences the length of treatment and care during the progressive stages. This is a matter in which genuine British hand-made carries an absolute guarantee, hence ensuring the highest degree of permanence. The colouring material, smalts, mentioned in the last chapter is resorted to in the highest class machine-made imitations, and its high specific gravity causes it to come to the underside of the paper. This creates a difference between hand-made and machine-made, which may often be relied upon for the detection of an imitation hand-made, especially if taken in conjunction with the laid lines in the paper. On a genuine hand-made, the impressed laid lines and the right side of the watermark are synonymous with the side showing increased smalt colouring.

The boiling and beating of the ragstuff for machine-mades is so regulated as to produce a cloudy appearance similar to that possessed by most hand-mades. When the pulp passes to the machine it flows on to the wire with the fibres in the direction of the flow. It is very necessary, when imparting hand-made characteristics, to upset this arrangement, otherwise the great difference in strength between cross and length-way of the sheet will immediately neutralise all its other good points. A patent arrangement is resorted to which pulls the fibres down while they are in an agitated state, thus preventing to a large extent the setting in one direction. After passing over the wire, the ensuing treatment is similar to that of loft-dried papers previously mentioned.



## MOULD-MADES.

Mould-made imitations of hand-made paper are produced in several ways, or rather by several types of machine. They all differ from the ordinary paper-making machine, inasmuch as they impart four deckled edges to the sheet by making but one sheet at a time, whereas the paper-machine makes paper in the web, with two deckled edges only, which are usually cut off when slitting the web into sheets.

One type of machine for the manufacture of imitation hand-mades consists of a cylindrical drum, upon which the desired size of sheet is arranged by placing bands in position. When the pulp is picked up on the cylinder, less of it lodges where the bands are, therefore deckled edges mark the outline of the sheet. Another type of machine imitates very closely the appliances and movements of vatman and coucher in the genuine process. A movable mould of required size receives a flow of agitated pulp from an elevated trough, from which it issues in regulated quantity, and is transferred down a large number of valves. The mould travels and automatically deposits the moist sheet (which has had the excess water previously removed by suction) on to the couching felts. Subsequent processes are somewhat similar to those employed in the genuine hand-made industry. Other machines are used on the continent to produce imitation hand-made stock, but the principle is much the same as one or the other of the aforementioned.

## DETECTION OF IMITATIONS.

To consider now the character of and differences between the three classes of paper, namely, hand-made, mould-made, and machine-made imitation. The two former usually have deckled edges all round. Machine-made paper is very rarely issued with deckled edges; if it is, they can be but on two sides. The great strength of the machine-made imitations was observed

at the commencement of this chapter, but it will be noticed that, despite the patented arrangement intended to obviate the set direction of the fibres, there is much diversity in strength crossway from length. This is an ever-present fault with each and every machine-made paper; equality of breaking strain has never been attained. It may be observed that in the tear of a sheet, the cross direction parts much readier than the length. In speaking of cross and length, reference is made not to the single sheet, but to the direction which the sheet assumed in its passage through the machine as part of the web. Other influences, apart from the direction of the fibre, affect the physical structure of machine-made paper, for the elongation figures in the table show a marked difference. During manufacture there is great tension on the lengthway of the web, which does not allow the paper to shrink as it otherwise would. In the crossway, full play is allowed. It therefore remains as a characteristic of machine papers that they will stretch much more in the crossway than in the length. Both mould-made and hand-made papers are nearer to being equal in all respects both ways of the sheet, although a slight diversity is apparent, introduced by the character of shake given to the wet pulp. However, we cannot look in this direction for a distinction between the two types of make. If a number of sheets are to hand for examination it will generally be found that little blot-shaped transparencies are visible on occasional hand-made sheets, but absent from mould-mades. These are the result of tiny drops of water falling from the vatman's hands on to the moist pulp on the mould. Obviously they cannot naturally occur on mechanical mould-made. The different mode of abstracting the water seems to impart a clearer look-through to mould-mades, whereas hand-mades are more cloudy. Again, the deckle seems more clearly outlined in mould-mades, with the laid pattern well defined to where the transparent deckle begins.

It is questionable whether the feel of hand-made paper has been perfectly imitated, although it requires a very long experience to be able to intelligently discern a difference. Constant handling seems to show that there is more brittleness in the tear of mould-mades, which do not as a rule possess the flexibility of hand-mades. Although identically the same materials may be used for paper by either process, it is not to be expected that the extremely careful and prolonged operations attendant upon genuine hand-made are likely to be indulged in for mould-mades, whose chief consideration is the fact that they must be decidedly cheaper than the genuine article.

Perhaps the best method of deciding how a paper is made, is to be thoroughly conversant with all the makers and brands of real hand-made paper. This information can readily be gleaned from the various paper-making directories, &c. Again, when the description of a doubtful make comes to hand, observe the wording with extreme care, noting whether it is definitely stated as hand-made. Mould-made papers are required by law to be stated as such and the use of misleading descriptions is thereby obviated.

## CHAPTER V.

### CARBONS.

Among the various types of paper specialities made use of in the commercial world, none have developed so rapidly, both in improved quality and increased output, as have carbon papers. Practically every business uses carbon paper for some purpose or other, whether for typewriter, pencil or agate style duplicates, or for pen copies. The demand is so large and so varied that every retail or wholesale stationer has dealings with the commodity, but very few are intimate with the nature and qualities of the numerous varieties now on the market. Of all papers carbon is about the most difficult



to judge, there are so many pitfalls and the distinction between a good carbon and an imitation is so obscure that even the most expert paper handlers are apt to err.

#### PRINCIPLES OF MANUFACTURE.

There are three main types of carbon paper, namely, pencil carbon, pen carbon and typewriting carbon. The principles of manufacture are much the same in each case, special characteristics being imparted on suitably chosen material to meet the particular exigencies of each grade. The old method of producing carbon paper (still largely in vogue) was to select a strong thin paper of close texture, fairly well sized with resin. A coating substance was then prepared from lard, soft soap, or olive oil and cerasin wax, mixed with a colouring matter such as lampblack, ivory black, indigo or carmine. The paper was then smeared or brushed over with this mixture, and heated to soak it in, after which it was allowed to set and the superfluous matter removed. Of latter years a new process has been introduced by means of which the greasy fat substance has been eliminated and a species of pure, unadulterated wax substituted. The old method of hand smearing the sheets has been replaced in most cases by up-to-date routine and machinery.

#### PENCIL CARBON.

To consider more closely the characteristics of each type of carbon paper, taking first the variety specially made for pencil or style writing. This is produced in several grades:—Coated one side (or semi) and coated both sides, or full, thin and thick (sometimes termed rich), and in five colours—black, blue, purple, red and green. Furthermore, it is possible to obtain hard or soft surface. The usual sizes for the wholesale trade are medium and double crown, flat or folded. The great majority of such carbon is cut to suit manufactured books of varying sizes, and therefore a

standard range of sizes such as is universal in typewriting carbons cannot always be satisfactorily arranged. One-sided carbon is for use where manifold paper and style is not desired, the writing being performed in pencil on soft printing or writing paper, and the carbon duplicate falling on the under leaf in contact with the coated side of the carbon. Where a style is used, two-sided carbon is necessary, in which case the upper leaf (or original copy) is constituted of manifold paper (see the next chapter). The essential in this manifold leaf is that it must be so transparent as to show the writing through from the back. The action of impressing the style creates two carbon copies at once, i.e., one from each side the carbon paper, the top impression being a carbon copy on the back of the manifold leaf. Thin carbon paper gives much sharper copies, but is not so durable as thick carbon, the latter needing heavier impression, however, to give a clear copy. The distinction between thick pencil carbon and typewriting carbon is so decided as to need no comment, but between the latter and thin one-side pencil carbons there is not a great difference in mere looks. In quality, however, the average difference is a matter of treble or quadruple cost. As a means of detection, it may be submitted that the pencil carbon is softer, usually duller on the surface, thicker, and not so even, smooth and clear on the back, while the film or coating of typewriting carbon is almost always hard and well polished. To smear the fingers with typewriting carbon requires an effort; not so with pencil carbon, which, with the important exception of the hard-surfaced non-grease variety, is usually moist, and fatty in the coating.

#### TYPEWRITING CARBON.

Typewriting carbon paper is a source of much profit to the stationer, the demand being a large and increasing one. Although regarded as a semi or one-sided carbon, it may occasionally be required, and can usually be

supplied, as two-sided. This variety is used between manifold sheets where a good number of copies are required at one operation. Naturally the impression is on the back of the transparent manifold, and is read through from the front. The same range of colours are produced as aforementioned for pencil carbons, with the addition of yellow, a seldom-required colour. The greatest retail demand in typewriting carbons is for the standard sizes: Foolscap and Quarto. For out sizes it is profitable to work from the flat ream, usually medium. To accommodate various requirements three weights are sufficient—light, medium and heavy, or thin, light and standard. The thinnest grades give more copies, of course, but are most susceptible to damage, whereas thicker substance gives less clear impressions through many copies, but wears well and withstands handling. In actual use, the class of work and number of copies requisite are the controlling factors in right selection of thickness. A vast difference in price is to be observed between certain low-grade products as compared with celebrated makes. To the unpractised eye no material difference is apparent. Even a close examination reveals little pronounced or distinct superiority of the high-priced typewriting carbon. The truth is that imitation is an easy matter—on the surface. It is necessary to thoroughly understand what it is that imparts the brand of genuine high grade to a carbon paper prepared for typewriting purposes. Without this knowledge the stationer cannot hope to satisfy the client who fails to understand why he is asked to pay four times the amount for a commodity apparently the same as the quarter-price grade.

#### FACTORS WHICH INFLUENCE QUALITY.

The quality factors which influence the price of carbon papers are body stock, colouring matter and greasy, fatty or waxy vehicle. Take first the paper, which may cover a very wide range in cost. The



cheaper paper is almost undetectable by ordinary methods owing to its coating. It is of obvious importance that the paper should be yielding or flexible, but cheap stock used for carbon coating contains an amount of wood, which creates harshness. To render the impression from the typewriter firm and clear, it is essential that the paper be very carefully made, in order to preserve the requisite closeness of fibre and texture. With cheap stock this cannot be ensured, and therefore, after the first few copies, the paper commences to bear directly upon the result. The correct fibres for high-class carbon papers are cotton, linen and hemp, mixed in definite proportions. Their cost prohibits their use in any but the best papers, and weak, brittle, short and inferior fibres take their place. The tear of the paper should be very tough and strong.

#### COLOURING AND PERMANENCY.

The colouring material is more important in many ways than the paper; its consequences are much more far-reaching. If the colour of a carbon copy is going to fade away after a short duration of time, what trouble and expense may occasionally be caused is a matter of conjecture. Certain it is that the majority of the colours used in cheap typewriting carbons, perhaps with the exception of black, are produced without any guarantee as to permanency. Particularly bright and alluring colours are produced by the aid of fugitive aniline dyes, at very little cost. Such colours are used for the cheapest carbons, and copies taken from them will fade in a comparatively short time, being almost bleached away if exposed for a period to direct light. The carbon itself deteriorates in colour, but to nothing like the same extent as the copy therefrom. Black and blue may be of fair duration, but purple, red and green cannot be relied upon at all. In the higher-class typewriting carbons black and blue are thoroughly permanent, purple is liable to lose its colour after a

considerable period, while green and red are also apt to fade somewhat.

#### THE COATING MATERIAL.

The coating matter of cheap grades is composed of low quality greases, which in addition to being soft and dirty to the fingers possess an objectionable odour. The surface may appear hard, and is usually glossed over, but a slight pressure will remove the upper hardness and reveal a soft interior. Furthermore, a mixture of cheap fats is liable to deterioration by chemical change, one substance working against another and again reacting upon the colour. Cheaply coated stock may at first give sharp copies, but after a short use blurred impressions are produced. The best class carbons are composed of pure, unadulterated waxes of high melting point, which remain unaltered throughout the life of the carbon. The hard, glossed surface is a natural one, and does not conceal a soft greasy interior.

#### PEN CARBON.

Another class of carbon stock is that known as pen carbon, specially produced with a highly sensitive film to reproduce the lightest touches of a steel pen. In other particulars pen carbon is akin to typewriting carbon, and is made in black or blue colours. To be of high quality, it should not readily smear by the weight of the hand or the touch of the fingers, otherwise exceedingly dirty copies will result. Of necessity, it must be thin, but on that account should be composed of tough body paper, to withstand ordinary handling. As with all extra thin grades, there is a tendency with poorly made carbons to absorb some of the coating through to the back of the sheet. This should be carefully watched, for in use smearing on the original copy is the result.

To sum up, a high grade commodity should partake

of the following qualifications:—Toughness, hardness and evenness of coating, permanency, durability and non-greasiness. It should give crisp impressions of good colour, fast to light, while smears and dirtying of the fingers should not be a characteristic feature.

## CHAPTER VI.

### MANIFOLD PAPERS.

Manifold paper was introduced as an accompaniment to carbon stock, for use in duplicating work. It consists of a thin tissue or interleaving paper, slightly oiled or waxed, and usually works in conjunction with a thicker sheet of ordinary writing or printing paper. After writing and simultaneously producing the two or more copies, the manifold sheet usually remains fast in the book or pad, bearing the original copy, while the thick sheet tears out at the perforation. Occasionally this order is reversed where it is desired to retain the thick sheet in the book as the original. The chief concern in this reversal is that where the manifold leaf is first, the writing may be performed with an agate or other style or point, pen or pencil not being necessary. The carbon impression shows through the manifold and is easily read from the front. When the thick leaf is first, pen or pencil is necessary and one-sided carbon, as opposed to two-sided carbon in the former case.

It is obvious, therefore, that manifold stock must include in its properties thinness, transparency, flexibility of surface, and a nature sensitive to the carbonic substance.

To obtain these essentials the true manifold paper is produced by special treatment, consisting of a regulated choice of raw material and mode of manufacture so far as the body paper is concerned. The web or single sheet afterwards requires to be saturated with a certain oil or wax compound, according to the class of stock intended. Careful drying and finishing, or smoothing,



follows the oil or wax process. The secrets of formulæ are jealously guarded by the respective manufacturers, especially in the wax process.

#### VARIETIES OF MANIFOLD.

Of more concern to the stationer is a knowledge of the various types of manifold in present use, and the methods of distinguishing one from the other. The varieties may be classed under three heads, namely:—Oiled, waxed, and unsaturated or dry manifold. Waxed and dry manifold may be procured in dull or glazed finish. The first named is usually glazed. The methods of distinction are fairly simple and require only a little experience to enable any stationer to immediately and accurately name the class of any given grade.

#### OILED MANIFOLD.

Oiled manifold has lost much of its early popularity, the other two classes of manifold stock possessing certain advantages. It is characteristic of oiled manifold that it has a peculiar and unpleasant odour, particularly when new. The feel of the paper is silky, especially in the thinner qualities. The colour may be a fairly good white, but it is very rapidly destroyed and in a comparatively short period assumes a dirty yellow hue, while stock of two or more years age has usually turned to a brown shade. Along with the deterioration in colour, the odour disappears to a large extent, while the paper itself is rendered exceedingly brittle and breaks practically without tearing. These points should be remembered in the selection of manifold stock for books which are required to last for a considerable period. Otherwise oiled manifold offers a beautiful surface for speedy writing with a style and produces an exceptionally fine carbon copy. A ready means of distinguishing between oiled and waxed manifold is to tear a piece and rub it against itself between the finger and thumb for about 6 to 12 rubs. The appearance is then noted,

when it will be observed that the oiled manifold shows white or grey crack marks, or fissures. The wax paper, however, shows a mass of pure white where the rubbing occurred. To gain a little useful experience the reader should practise on authentic specimens and compare results. A frequent objection against oiled manifold is the tendency to create oil stains on the white writing paper.

#### WAXED MANIFOLD.

Waxed manifold presents a white and less transparent looking surface than oiled, while it also tears with a distinct white lining each side the tear, whereas oiled manifold tears with a grey edging. Waxed stock possesses no odour and is not so highly glazed as oiled. The colour keeps for years and the flexibility and strength are also retained in a large degree. The rubbing test has been noted, but an equally efficient experiment is to cut strips of oiled and waxed papers and apply a light to each, when it is observed that a white wave of melting wax precedes the flame on the waxed manifold and sets white on extinguishing the light. With the oiled specimen this characteristic is not pronounced, while the burning is by no means so regular and slow. In the look-through, waxed manifold presents a glistening appearance, but does not seem so greasy as does the oiled variety. Looking on the surface, waxed manifold has a milky appearance when compared with oiled.

#### DRY MANIFOLDS.

The third class of stock is neither oiled nor waxed, and is used largely in cheap work, where it has a decided efficiency for ruling, printing and handling. It is really nothing more than an extra thin, cheap bank, glazed or unglazed, beaten and chemically treated during manufacture to produce transparency, and a homogeneous texture. Unlike the two former grades of manifold, this variety rubs without producing charac-

teristic whiteness, while it tears brittle, and without any fibrous display as compared with an ordinary thin bank paper. It crackles on handling, has a fairly translucent look-through, but possesses nothing of the silkiness of real manifold. The sensitiveness to carbon of waxed or oiled manifold is not possessed by the dry grade, and the copies produced are less legible. The property of resistance to the effect of rubbing against the greasy carbon is very inferior compared with the oiled or waxed grades. The ease of handling is, however, a great factor and saves much labour in handling, counting, ruling, printing and making up. Register in printing between manifold and thick is distinctly helped when dry stock is used. Again, in cutting, the tendency to slip or skid is overcome, thus economising in labour. In present day rush, and cheap work in commercial duplicate systems, this grade of so-called manifold is a great boon, but it has its limits and must be cautiously approached when good work is in question.

The essential qualities in a first class manifold may be outlined as:—Fair degree of strength, perfectly even surface, transparency, freedom from odour, good white durable colour, capacity to give perfect rendering of the written matter, through several copies if necessary (with thin substances), easy and good ruling surface. The surface should be tested to see if the ink rolls up in pearls.

#### STORING MANIFOLD PAPER.

Finally, the question of stocking or storing manifold requires consideration. Knowledge and care are necessary, for more money is probably lost on manifold stock than any other. It is necessary to be conversant with ream variations, manifold reams containing variously 480, 500 or 504 sheets. A plain announcement of the contents should appear on the wrapper. In the handling of the stock quire marks are greatly to be desired in every ream of manifold paper, yet are seldom found



except in the highest grades. The wrapper packing must be air and dust-proof, otherwise quick discolouration, brittleness and rotting will set in. To help against this, observe the use of substantial wrappers with ample lap ends and good tying up, the latter being necessary to avoid the sheets slipping about inside the parcel. It is an easy matter to create hours of work by the dislevelling of manifold sheets. Remnants call for the same scrupulous care in handling and wrapping up, after which neatness in placing should be enforced. It is a shabby practice of some stationers to regard small remnants of manifold as waste, to be crumpled up and thrown away; such a practice bespeaks a careless and unsystematic disposition. Store all manifold away from heat or damp in excess, the former tenders the stock and dries its nature, the latter ruins the surface and retards ruling operations. The stock should always mature a month or two before ruling, otherwise there is an ever-present tendency for the lines to break off and the ink to run into little balls. If such a defect occurs and cannot be got over by faking the ink, change the manifold and give it a few weeks to mature, when the difficulty will have vanished.

## CHAPTER VII.

### BLOTTINGS.

Blotting paper comes within the province of every stationer, wholesale or retail, therefore some knowledge of what a blotting is, and how it is produced is desirable in handling the commodity.

Blotting paper is produced by similar methods and from the same material as many ordinary papers, but to impart the property of absorbency along with characteristic softness and bulkiness a particular type of treatment is employed. Summarising the procedure, the material for the highest quality blottings is soft old cotton rags, which give open texture to the sheet. Soft

linen and cotton rags may be selected, new cuttings making too harsh a paper. Cheaper blottings may be made from a mixture of cotton rags and chemical wood-pulp, while the commonest grade of all may include mechanical wood-pulp in its composition.

The coloured rags are used separately if desired, to produce tinted blottings, turkey-red rags making an exceptionally fine pink blotting. It must not be understood however that all coloured blottings are from dyed rags, the great majority are from bleached white rags, dyed to shade after the pulping.

The selected rags are picked, cut and boiled in a kier with water only, omitting the caustic lye if possible so that there will be no suspicion of greasiness imparted to the pulp. With the same end in view the rags are beaten to a fibrous pulp at a rapid speed. The object is to avoid impregnating the fibres with water and to so cut and chop them that the centre cavity in each fibre will be preserved intact, thus aiding greatly towards high power of absorption.

In the case of writing and printing papers the resin size and mineral loading are added to the pulp while still in the beater, but with blottings no size is added otherwise the absorptive quality would be impaired. On very rare occasions a little mineral loading (really clay) may be added to the pulp to help in binding the fibres together in the ultimate sheet, but this also affects the absorbency. It is more usual to add a little starch, which creates the binding effect without deteriorating the absorbency, and at the same time imparts a pleasant firmness to the sheet. From the paper-making machine the blotting is turned out with a matt finish and a porous interior. Smooth blottings are sometimes met with but they are a mistake, for their absorbency diminishes in proportion to the smoothness.

The mottled blottings are produced by mixing a small proportion of coloured fibres in with the pulp, long wool fibres from a coloured fabric often being chosen. It

is interesting to notice the direction of these fibres in the sheet, they afford useful information on the flow of the pulp and influence of the side-shake of the machine upon the fibres. On the wrong side of the sheet it will be seen that the fibres have a decided tendency to range themselves in a direction parallel with the flow of the pulp, i.e., in the machine direction. On the right side of the sheet (the upper surface) they are scattered in all directions, due to having received the full benefit of the shake given to the pulp while it is forming the sheet on the travelling wire of the machine. The under-side settles down very quickly and is scarcely affected by the shake.

#### TESTS FOR ABSORBENCY.

The stationer should be able to judge the quality of blotting paper tolerably well, that is, so far as it is successful in fulfilling its purpose, namely, to blot. The following technical tests, which may be applied where necessary, are reliable as affording a useful indication of the merit of any particular grade of stock. The true test is for absorbency, and may be directed in three ways: first, to determine the rapidity of blotting; second, to note the extent to which the paper absorbs the ink; and third, to find out the value of the blotted sheet for re-blotting and further use. It must be remembered that although a blotting may answer the first two tests fairly well, and handle satisfactorily, yet if it will not blot twice in the same place, it is an unsatisfactory paper for commercial use.

To test for absorbency, including both rapidity and extent, a specially devised apparatus may be obtained, or for experimental purposes the reader may construct an efficient substitute. As many 6-in. by  $\frac{1}{2}$ -in. strips of the blottings as are required are clipped at the top to a T arm, suspended over a trough of Stephens' ink. The arm is lowered so that the strips simultaneously dip into the liquid to equal depths. The rapidity and



evenness of the rise of ink are noted for five minutes. From comparative tests, decisions on the bibulous quality are fixed and standards determined. It is found that the ink rises 60 m/m. on a good quality blotting. To test the blotting for repeated use, dry the strips and re-test them; it will be found that poor grades of blotting fail to take up the ink.

A practical and simple test is that known as the "Zone Test." A piece of the blotting paper is placed over a tumbler and a good-sized blot of ink, preferably from a measuring instrument, dropped on. The time required to soak in, the area of the blot and the proportion of the area of the outer zone to the inner black area, are all noted and comparisons made from set standards. Poor blottings are tardy at soaking up the ink, while they give an outer zone of decidedly weaker colouring than the inner area. Again, it will be noted that the poorer the blotting paper the more jagged is the outer edge of the blot. Good grades give a sharply defined outer edge, regular in shape, and show comparatively little outer zone.

To further test the efficiency of the blotting draw an ink line across the blot and observe whether the paper still retains enough nature to effect a second blotting in the same place. A slight rubbing with the finger is sufficient to show whether the ink is properly absorbed; if it is not, it will readily smear.

Much can be judged by merely writing on hard paper and blotting quickly and immediately. From the cleanliness of the edges, or on the other hand, from the slight smearing, a fairly accurate decision as to the absorbency alone may be made.

Even without these testing methods a practical stationer should be competent to pass reliable judgment upon the value of blotting papers. So far as the well-known standard grades go, judgment is practically uncalled for, certain English blottings being above inexperienced criticism. With the various new brands of

blottings, often alluring in price and fairly attractive at first appearance, it behoves the stationer to deal carefully and educate himself in blottings up to a standard which will enable him to detect the weak points in the make-up.

The first and most essential feature in any blotting paper is its absorbency, the character of which may be gauged from the previous tests. The feel of a blotting paper is an important factor in practical judging. The desirable quality is a light, velvety softness, giving the impression of bulk and a certain amount of strength. There should be no suspicion of harshness or brittleness. An all-cotton blotting has a mellow bulkiness, a good cotton and chemical wood blotting handles a little firmer, but the introduction of mechanical wood-pulp renders the stock brittle and harsh.

Equally potent to the feel is the tear, which should be quiet, rather soft and yet somewhat firm as though the fibres were commingled well. The parting at the tear should not be too quick, as though there was no binding power; this indicates an unsuitably treated fibre. There should be no sign of crackling, crispness, nor brittleness, any of which indicates a poor paper. It will be observed that blottings containing mechanical wood-pulp tear with the brittleness usually associated with cheap news and printing papers. The cheapest blottings tear very much like a thin, soft, chemical wood-pulp board.

#### COLOUR.

Colour is all important, the chief essential being that it should be absolutely regular, free from specks or splinters and both sides should be equal in tone. If white, the colour should be clean and bright, not inclined too much either to cream or blue. Cheap white blottings display a greyness or dirty creaminess which is distasteful to the eye. Many low-priced coloured blottings are dyed with aniline dyes, all of which cannot

be guaranteed fast. For interleaving blottings this does not matter much, but for desk blottings, colours which fade are an abomination. If it is desired to ascertain the efficiency of a brilliantly tinted blotter, expose part of it at a window for a week to bright sunlight, and then compare with the original sample. The standard blottings are dyed with reliable colouring matters, but there are certain brilliant or delicate new shades and tints which are not so permanent as they ought to be, even for blotting paper.

The surface of blotting paper should be carefully examined. A great fault with some makes is that they are not compact; the manufacturer naturally aims at making a bulky product, with plenty air-space or porosity. If the mark is over-stepped the ultimate paper is fluffy and not at all compact. The fibres are too loosely held, and easily rub away, as a consequence of which, after a little use and the usual friction, the surface becomes quite rough, thus making its use unpleasant, while there is also the additional disadvantage of collecting and holding dust and dirt. Furthermore, such a blotting paper is decidedly weak, and in use speedily tears at the edges, becoming unfit for usage long before its absorbency has diminished. The other extreme is a smooth blotting, which is so compact that it has lost the greater part of its absorbency. The maker of such a paper is anxious to impart a pleasing feel, in which he succeeds, but at the expense of the cardinal virtues. What the stationer needs to do if he wishes to master the art of discrimination in blotting papers is to become acquainted with these oddities in manufacture, so that he may exercise a shrewd judgment when the new makes of cheap and attractive blottings are offered as a set-back to the present standard and dependable grades.



## CHAPTER VIII.

### WRAPPING PAPERS.

Although among the most widely used of the many classes of paper, very little information is to be met with, either in text books or trade magazines, relating to wrapping papers. In such a short chapter as this only the general outline of the subject can be touched upon. So far as the manufacture is concerned, it is sufficient to indicate that the ordinary browns, krafts, unglazed small hands, pressings, &c., are made upon the Fourdrinier paper-making machine in the usual manner, the difference from ordinary papers being in the selection of raw material and preliminary operations of boiling, bleaching, and beating to pulp. The class of thin wrappings known as biscuit caps or M.G. tissues, along with some of the thin M.G. wrappings, are made upon the single cylinder or "Yankee" paper-making machine. In this case the web of paper is formed on the wire and then traverses a very large polished steel cylinder, during the course of which travel it is dried. The result is a high polish on the side of the paper next the cylinder and a rough outer side, the finish being termed M.G., i.e., machine or mill glazed.

Wrapping papers are divided into a considerable number of classes, mainly according to the different functions the paper is primarily intended for. An amount of confusion has been created in the lay mind through the inappropriateness and lack of meaning in many of the designations applied to certain types of wrappings. To some extent we will endeavour to make clear the reasons for the adoption of the particular title chosen, at the same time indicating as far as necessary the characteristics and uses of each class.

#### BROWN PAPER.

This is the term applied to ordinary wrappings not possessing any special characteristics. It is made in

the series of sizes from Imperial Cap up to Extra Large Casing. The raw material includes old paper, mill-board cuttings, mechanical wood pulp, bagging, jute, and sometimes hemp fibre. The finish is dead, the right side being slightly smoother than the under side.

Unless otherwise stated, the colour is usually very dark brown, the unbleached material and stained boiling liquor helping towards this shade. Ochre and golden browns are a yellow-brown class of wrapping, the colour being imparted through dyeing a partly bleached raw material, hence the price is usually a little higher than dark browns. The best variety of this type of wrapping is the glazed golden brown shade, free from blotches and splinters, and perfectly even and smooth finished. Brown casing is a term often understood as implying a quality, whereas it should merely indicate the size.

#### ROPE BROWN

differs from the former browns in the matter of raw material and consequent strength. The shade is usually dark brown, but light grey and a near approach to white (glazed white rope) are commonly met with, while the finish may be either rough or glazed. The price is fairly high for the genuine class of stock. It is an easy matter to detect the bits of rope fibre on the surface of the paper, which are a sure indication that the paper contains at least some rope. All rope fibre is not of the same value, therefore the bald statement "Rope Brown" must not be taken to mean too much. Under the conditions imposed by war, rope brown is manufactured solely from common waste.

#### AIR DRIED BROWNS

are a high class variety of wrapping, deriving great natural strength and elasticity (a desirable feature in all wrappings) from the method of drying indicated by the designation. Ordinary browns are dried by heated cylinders on the paper-making machine. Air-dried

browns are dried naturally by prolonged exposure to the atmosphere. As a rule, the raw material for this type of wrapping is of the highest quality, including hemp, manilla, adansonia, jute, bookbinder's cuttings, best rope, &c.

In addition to the ordinary functions of a brown paper, which include the wrapping of all classes of parcels where strength is more desirable than appearance, air-dried browns are largely used for gold and silver bags, seedsmen's bags, mail wrappings, banding slips, and any other purpose where great strength combined with pliability and elasticity is essential. Tenacity of tear, without any sign of brittleness or sponginess, characterises this grade of wrapping, while the finish is as a rule of a natural (slightly rough) texture.

#### KRAFT BROWNS.

Very different from the everyday brown wrapping is the class of stock known as "Kraft." The name is of German origin, signifying strength, and is, in the case of the genuine article, singularly appropriate. This grade only sprang into existence a few years ago, but gained immense popularity immediately on its introduction. Kraft brown is produced from unbleached chemical wood-pulp, boiled by the sulphate of soda process. Both the boiling and beating are regulated so that the full length of the fibre is preserved, while the latter process is prolonged and so arranged by the bluntness and position of the beating knives, that the fibres become partly hydrated. By this means tremendous strength and cohesion is secured in the ultimate sheet. The natural colour of the boiled material is brown and the boiling liquors become so stained that they act as a dye. To impart special shades, dyes are sometimes added to the pulp. The strongest "Krafts" are undoubtedly Scandinavian, the home of the original product. From imported pulp, British manufacturers have long made an imitation grade, while American papermakers are



making great efforts to equal the Swedish and Norwegian manufactures. There is little doubt that the climate of the latter countries conduces to the ideal growth of wood for this class of pulp and also affords facilities for the production of very strong wrapping.

Krafts are made in the full range of sizes, the most popular being Casing, 36 by 45 inches. The standard shade is golden brown, although darker shades may be obtained. Finishes vary from M.G. to rough both sides, the usual style being slightly mill glazed. Krafts answer every purpose where neatness, combined with strength, is desirable. They make a high-class bag paper and are the very best types of wrapping for books and stationery. When used in conjunction with the gummed-strip sealing machine, carrying shade to match, effective packing is secured. One fault of highly glazed krafts is that they work badly with sealing wax. The latter comes away from the smooth surface and frequently damages the inside goods, particularly if they happen to be leather-bound books. The gum sealing machine obviates this complaint, or if wax must be used a dull finished kraft may give satisfaction.

### SEALINGS

were a grade of wrapping introduced when sealing wax for parcels was at the height of its popularity. They constitute a type of stock which possesses reasonable strength and a finish well adapted to hold the wax firmly. The strength is very necessary owing to the fact that a big pull is exerted at the edge of the wrapper when stretching it out taut for sealing. To a very large extent kraft browns have deprived sealings of their place in the market, but recent smart innovations in tint, finish and marking have brought them to the fore again.

The original product was a drab paper, matt finished on both sides. Among the varieties which may now be obtained are: M.G., smooth one side, even-sided, distinctive colours and striped. The M.G. frequently

possesses the defect toward sealing wax before-mentioned, but the unglazed sealing is reliable. For smart and distinctive packing, particularly of small memorandum books and stationery in general, the coloured sealings are especially suited. The striped variety answers the same purpose and gives something a little out of the ordinary. The usual sizes are double-crown, double-demy, casing and double-imperial. They are usually sold at ream price, whereas the classes of wrapping previously dealt with are sold at per cwt.

### BISCUIT CAPS.

These are known also as Sulphite or M.G. Caps, and form a grade of stock used for confectioners' and grocers' bags, drapers' wrappings, and a whole host of purposes where a thin, clean-looking wrapping paper for dry goods is required, which, at the same time, must be fairly tenacious. Counter envelopes, picture post-card envelopes, glove bags, seed and pence envelopes are all manufactured largely from M.G. caps.

The names of the paper convey some indication of the material and original purpose of the stock. Sulphite wood-pulp, partly bleached, is almost always used, although cheap grades contain a percentage of mechanical wood-pulp. M.G., of course, means machine or mill glazed, and this type of finish naturally results through the paper being made on the "Yankee" or single-cylinder machine. "Biscuit" is probably derived from the colour and crispness of the paper, while "cap" is very obscure, presumably being connected in some way with the size of that name. As a matter of fact it is entirely a misnomer, for the everyday size of M.G. Caps is double-crown. They are usually sold at per ream.

### SMALL HANDS OR DOUBLE SMALL HANDS

constitute a class of wrapping used mostly by drapers, grocers, and in lesser degree by bagmakers. They may

be used for similar purposes to biscuit caps, but are not so hardy a wrapping. To some extent the latter will withstand moisture and damp, but small hands are soon burst asunder when damp. They are not very strong except in the best English rag qualities, but as a quick wrapping for small and soft goods they are ideal.

The name is really a size, but is applied to the class regardless of dimensions. It is a reminiscence of the early days of paper-making, when the watermark of a hand, an emblem of faith given or kept, was imparted to a certain size of coarse writing paper. Evidently the size corresponded with an early popular size of small hand wrapping. Small Hand does not really exist as a size; double small hand is the size applied to a range which graduates from 14 in. by 22 in. to 20 in. by 30 in., the latter being the usual standard. Weights run from 8 lb. upwards, and variations in finish may be obtained from rough to M.G. (which, however, more resembles a biscuit cap).

#### NATURE BROWN

is a thin, very cheap class of wrapping for drapers, cutlers, small goods, glass and pot wrappings, woollens, &c., &c. It is very useful and cheap as a preliminary cover for small articles which require boxing or packing in parcels of quantities. It is flimsy and lacks strength, whilst toward moisture it is more sensitive than blotting paper, therefore as an outer wrapper it is in most cases useless. The name "Nature" refers to the method of preparing the pulp. Very light boiling treatment, no bleach, no dye and little or no sizing, results in a comparative freedom from chemicals and imparts the characteristic brown shade. Through this natural preparation many impurities find their way into the paper, which often shows large splinters, dirt spots, dark patches, specks, &c. The usual size is double-crown, and M.G., striped, rough or smooth finishes are to be had. The raw material for natures is unbleached chemical or mechanical wood-pulp and jute.



In conclusion a note or two may be made on special grades, and a few general remarks may be added. Royal Hand is a thick and spongy wrapper used by grocers and for common packing, where strength is not a first consideration. Grey, white and blue are the prevalent shades, and the finish is dead or just smoothed. The size is 20 by 25, as indicated by the term "Royal," the latter being derived from the fleur-de-lys and crown which in early times was the watermark applied to that size of paper. The same watermark is to be observed nowadays in most writings and account-book papers measuring 24 by 19, or thereabouts. Grass-bleached tissue is a thin white wrapping chemically pure, due to the natural mode of bleaching employed. It is highly important that wrappings for jewellery, cutlery, metal goods, needles, &c., contain no ingredient likely to affect the metal. Acid, sulphur, or bleaching residues are often met with in ordinary wrappings, which are therefore not safe for goods of the afore-mentioned character. Grass-bleached tissue is thoroughly reliable and should be the only type of flimsy wrapping used for metal goods. Silver in particular is speedily blackened by sulphur, and sulphur is a natural sequence of badly produced sulphite pulp. For this reason biscuit caps and M.G. sulphites are not dependable as a wrapping for silver or plated goods.

## CHAPTER IX.

### SPECIALITIES IN PAPER.

From time to time the wholesale or retail stationer is called upon to handle certain specialties in paper, concerning which he may know nothing except the name. That he may more confidently deal with these outside grades, we may summarise the characteristics and mode of production of some of the more important varieties.

#### VEGETABLE PARCHMENT

is a greaseproof and waterproof paper, made as a rule

in double-crown. Its essential characteristic is that it increases in strength and tenacity when exposed to moisture or actual liquid. The chief purpose for which it is used is as a wrapping for foodstuffs, tobacco, jam-pot covers, bags, &c. Vegetable parchment is made from pure unsized printing paper by passing it through a vat of cold sulphuric acid at regulated strength. The excess acid is removed and the residue in the paper neutralized by ammonia, after which slow drying over cylinders is performed. The change which occurs in the paper is due to the sulphuric acid partly dissolving the surface fibre and thus forming a coagulated water-proof film.

#### GREASEPROOF PAPER

is distinct from vegetable parchment in that it does not undergo a special chemical treatment after the paper is made. It is often termed imitation vegetable parchment, but in reality it is very little like the real thing. Greaseproof papers are prepared from sulphite cellulose subjected to prolonged treatment in the beating process, until the fibres become soft and greasy. Such a pulp makes up a close, transparent and extremely hard paper, resistant to grease and liquid matter. The greaseproof quality may be tested by laying the sheet on a sheet of writing paper and spreading a few drops of oil of turpentine over it by means of cotton wool. If the stain soaks through to the writing paper, the sheet under test is not a real greaseproof. An absolutely reliable and much more simple test is to masticate a piece of the paper. If it is genuine greaseproof the chewed piece will retain its formation, but if imitation it will be pulped.

#### PERGAMYN.

This is really a greaseproof imitation parchment paper, and is produced from the pulp of high class Swedish cellulose, to which is added an excess of size,

a little glycerine and some grape sugar. The pulp is finely ground for 12 to 15 hours until warm, when it is ready for the paper-making machine. Great care is necessary on the machine owing to the tendency to stick to the wire and presses. The finished product shows a high degree of resistance to grease and liquids, and is eminently suited to wrapping certain commodities.

#### TRACING PAPER.

This class of paper is largely used among machine engineers, draughtsmen and artists, and is sold in the roll or in single sheets. The shade may be blue-white or cream; if for photographic purposes, blue-white is preferable. The basis of tracing paper is a thin writing paper, fairly well sized to take Indian ink. The paper may be treated either in the reel or in single sheets, by machine, with an oil or fat varnish. An alternative method is to wax the sheets. With oil or fat tracing paper drying by natural means in air is necessary in order to avoid rancidity, which would be promoted by heat. The component parts of an oil varnish are 8 parts each of oil of turps and castor oil, 2 parts of Canada balsam, and 1 part copaiba balsam. Other mixtures may be used, as bleached shellac, mastic and alcohol, or dammar varnish, cotton seed oil, poppy oil, almond oil, &c. The finished paper should be free from any taint of rancidity, must not be hard and brittle nor yellow at the edge. Waxed tracing paper is superior in many ways, keeps longer and does not become brittle, while it is free from smell. A recipe for the coating solution is 10 parts bleached beeswax, 30 parts alcohol, 5 parts ether. This solution is left in a bottle for several days in a warm place, being shaken up occasionally.

#### BLUEPRINT PAPER.

This is the paper used for taking rapid duplicates from machine plans, &c., the lines of the drawings coming



out either blue on white background, or vice versa, according to the coating of the material. The most popular variety is the one which comes out with the blue background. To prepare this class of speciality, a plain albumenized paper is used, i.e., a paper from pure chemical-free rags, coated with a solution of egg albumen, water and ammonium chloride. For the blueprint treatment two solutions are used:—

A. 1 part ferro ammonium chromate in 4 parts water,

B. 1 part potassium ferrocyanide in 6 parts water.

These are mixed together and kept in the dark. When necessary the paper is carefully and evenly coated over with the solution, using a broad camel-hair brush. In use, the printing is complete when a grey-green ground appears. The development to pure blue is performed in pure water, while if required, intensifying may be done in a 5 per cent. solution of hydrochloric acid, followed by washing and drying.

The foregoing is for white lines on blue ground, but if the reverse is desired a different treatment is necessary. The variety known as ferro-prussiate paper is largely used, to prepare which, the albumenized paper is floated for half a minute in a bath of ferric chloride (10 parts), water (100 parts), and citric acid (5 parts). The operation is performed in the dark and followed by drying. An exposure against the drawing is made and the developing done in a bath of potassium ferro-cyanide (25 parts) and water (100 parts). To intensify, dry and then wash with a 1 per cent. solution of hydrochloric acid, following up with a final washing in water and drying.

#### FIREPROOF PAPER.

It is occasionally desirable to supply paper for legal and other documents which are required to be resistant to the effects of heat and fire. The basis of such product is almost always asbestos, which is reduced to fibre and washed with a solution of potassium permanganate, then bleached with sulphuric acid. Of this prepared

fibre 95 parts are mixed with 5 parts of pulped cellulose. The mixture is then beaten together with glue-water and borax. The finished paper is afterwards well calendered to give a hard, smooth sheet. Fireproof paper made in this way will resist up to 800°C. The ink for printing must also be fast against fire, and may be prepared from platinum chloride, lavender oil, lamp-black and boiled oil, while a writing ink may be made from Indian ink, water and gum arabic.

Other methods for making fireproof papers are based on asbestos, with the addition of water-glass as a binding medium to effect the cohesion of the fibres in case of fire.

### PAPIER MÂCHÉ

is to many stationers a name only; what the substance is and where it comes from is to them a mystery. As a matter of fact it is really mashed or pulped paper. Its uses extend to trays, boxes, ornaments, structural and architectural decorations, japanned goods, &c. The commoner grade of papier mâché is made from old waste paper which is re-pulped and mixed with glue, paste, and if necessary, chalk and clay. The pulp is pressed into form, coated with linseed oil and then baked at a high temperature, being finally varnished. White of egg and sulphate of iron may be added to the pulp to render the finished product waterproof.

Higher quality papier mâché is made from the best Swedish wood pulp or cellulose. Sheets of this are soaked in paste and glue, pasted together and then pressed to desired shape in a mould. Stoving, oiling, trimming and decorating then follow; if the decorating takes the form of japanning, the goods are rendered waterproof, thus dispensing with the albumen and iron sulphate.

### LINEN FACED PAPER.

The popular linen faced cambric or canvas grained effect is produced on any ordinary paper by one of

several embossing methods. Sheets of paper may be interspersed by slightly larger sheets of linen and the whole subjected to hydraulic pressure. The more popular method is to emboss in the reel, in which case an endless linen web is affixed to the surface of the cylinder, or in some cases is forced into a soft metal bed to ensure regularity of the linen threads. The linen itself is dispensed with in cases where the embossing cylinders themselves are engraved as matrix and die.

#### COPYING PAPER.

The term copying paper is not always applied correctly, but taken in its true sense it applies only to the class of paper from which letter copying books are made. Contrary to expectation, the propensity to take perfect copies is not due to the introduction of special chemicals to the paper, although in rare cases iron salts may be added to aid legibility in reproduction. During manufacture the fibres are treated so as to retain the properties of absorbency and strength. The pulp is entirely unsized and thus resembles blotting stuff, while differing from tissue paper. The best copying papers are from rag, while cheaper grades are from wood pulp. The characteristics of a good copying paper should be strength, good clear white colour, freedom from cloudiness or knots in the look-through, perfect absorbency and good drying power, with retention of strength and structure after wetting. Whether glazed or unglazed makes little difference except that perhaps the smoother surface offers special facilities to the copying brush. An ordinary tissue may resemble copying paper in many respects, but it lacks the clarity, evenness, and above all, the rapid absorbency.

#### CHAPTER X.

##### INDEXING AND FILING CARDS, FOLDERS, &c.

Vertical Filing and Card Indexing systems have long since proved their value as a development in office and



factory routine. To be abreast of the times it is essential that the stationer himself should be conversant with the component parts of the systems and the uses thereof. Complementing this knowledge should be a well grounded experience in qualities, and acquaintance with the reasons for certain characteristics required under varying conditions. To help to this end a brief survey will be made of the component parts of the system, and a few remarks added on the qualities and characteristics of the material used.

Broadly speaking, the systems may be classified as two, the vertical filing and the card indexing.

The Vertical File presents the simplest method of distributing correspondence, &c., while it is obviously the quickest way to drop on required matter. Added to this, it is easy of use by the inexperienced person, provided ordinary care is used. It consists of a drawer or box (or cabinet containing series of same) to hold cards or correspondence filed away under an indexing system in vertical position. Guide cards appear at regular intervals to point out the positions of the folders which hold the papers or cards and which precede the guide cards. The folders are usually strong and durable manilla sheets with a projecting tab at the top to bear such information as name, number, or alphabetical array.

#### GUIDE CARDS.

The guide cards which subdivide the folders into various classes, or on the other hand into numerical order, are composed of very stout card, or strong manilla board. They may be coloured to indicate certain subjects, a different colour to each, although it is usual to make but three or five stock shades, as buff (for correspondence), blue (for invoices), and red (for receipts), added shades being salmon and white or green. The guide cards for folders bear projections at the head, the width of the projection corresponding to the number of

positions or cuts required. Thus we may assume as few as one, or as many as ten positions for the tab, necessitating in the latter case a very narrow tab, in fact a tab slightly under one-tenth the width of the card. The usual sizes for folders and their guide cards are 4to ( $11\frac{3}{4}$  by 9), and foolscap ( $13\frac{3}{4}$  by 9), although many other special sizes are made to order.

When handling these goods it may be necessary to have some idea of the number which go to make an inch, an average computation being 80 to 120 folders and about 40 guide cards respectively.

### CARD INDEXING.

In the Card Indexing system the component parts, apart from the furniture, are plain record cards, or tabbed record cards, and guide cards. These record cards, interspersed by guide cards, are arranged in shallow trays similar to vertical file drawers, and they possess the advantage over book systems that they can always be added to or taken from without destroying or disturbing the alphabetical or numerical order.

The cards are made in three standard sizes (some makers run to five or six sizes), namely:—

8 × 5 + tab.

6 × 4 + tab.

5 × 3 + tab.

They are supplied in three thicknesses: thick, medium, and thin, or heavy, medium, and light. The guide cards, according to their function, are much thicker than the record cards. The record cards bear the desired information and are ruled and printed in a large number of patterns suiting various requirements. The guide cards are really to direct the user to the place where the information may be found, and they are shaped with projecting tabs of any desired style or size, depending upon the number of positions requisite for the tabs. Thus, the tabs may be as 1, 2, 3, 4, or 5 positions, or any number. In the case of one position

the tabs extend almost full width of the card and fall directly behind each other, but with a larger number of positions and tabs run in slanting series. To further aid distinctiveness, both guide and record cards are made in sets of colours, which system lends itself readily to such classifications as weekly, monthly, quarterly accounts, &c. Three colours only of guide cards are usual, blue, buff, and salmon, or buff, pink and blue.

### RECORD CARDS.

Record cards are stocked in two varieties, i.e., with tab, or without tab. The latter depend solely upon the guide cards for classification. Tabbed record cards augment the service of the guide cards and may be used to form a double classification of the subjects. Necessarily the amount of information carried upon the tab of a record card is limited, for the available space is small, the tab measuring probably but  $\frac{5}{12}$  in. wide by  $\frac{3}{10}$  in. high. A letter or numeral is all that is required, however, and with this help on the record card, augmented by broader classification on the guide card, exceedingly intricate subjects are rendered most simple in working. Cross indexing in perfectly systematical and easy fashion is accomplished in a manner impossible in the case of an ordinary book. Furthermore, the use of tabs renders unnecessary the introduction of a range of colours to subdivide subjects and parts.

It is, of course, understood that many of the cards used in these systems are punched at the bottom edge, in the centre, with a hole shaped to the sliding rod which is fitted in the bottom of the drawer or tray. By this means perfect position and alignment of the cards is assured. With different systems the shape of the punched hole varies, sometimes forming a T-shaped slot. The chief concern is to get the perforation dead central, or trouble will arise in feeding the rod through the cards.



## FUNCTIONS AND QUALITIES OF THE CARDS.

From the nature of the functions performed by the cards, folders, &c., of the system, it is evident that very high quality is necessary in the material. Guide cards particularly are required to withstand a tremendous amount of handling and wear and tear, for they are likely to remain in use for years without renewal. Record cards are in some cases transferred from the tray as they are finished with, hence they are hardly subjected to the wear which guide cards receive. Nevertheless, the importance of the information borne upon the record cards necessitates the highest quality of material, in order to retain perfect shape and withstand the ravages of time. Owing to the amount of writing performed upon record cards, a fine writing surface is essential, while to maintain neatness and repel dust, the edges of the cards must be cleanly cut without the trace of a burr. Whilst on this point it may not be known to many readers that the cut from an ordinary guillotine knife through a pile of cards results in a clean cut edge to the inner portion, but a burred edge to the outer. To secure all clean edges, two cuts are necessary. The great majority of Index card makers perform the cutting upon rotary card-cutting machines, while in some cases the cards are cut singly on a small hand-chopping machine. The rotary cutters work with a shearing motion, the cut being performed by an upper and lower series of disc slitters. Another point worth mentioning in connection with record cards is that where plain and punched cards are required to be ruled to a pattern, not the slightest difficulty is encountered in ruling over the punched hole. The pens glide over just as though no punching had been performed.

The knowledge required in placing or executing an order for card index systems consists of:—quantity, quality, thickness, colour, size (exclusive of tab), position of tabs at head, ruling, printing, and rod punch

shape. This applies to either folders, guide cards, or record cards.

The demand upon index cards is for:—

1. A good writing surface.
2. A surface which will permit of erasures.
3. A material that does not split or dog-ear at the corners or become limp.
4. A material that will endure constant handling.

And these are the points that the stationer must put before his customer to turn him off cheap and nasty materials:—

1. The main expense of compiling an index record is not constituted by the index cards but by the labour of typing or writing the entries on the cards.

2. Economy is achieved by the long life of the cards.

3. Cheap materials result in short life and an inevitable re-writing of the index at an early date.

4. Cheap materials make poor index cards because after a brief period of handling, the edges split and render reference difficult, involving a waste of time which, calculated in £ s. d., shows the "cheap" cards to be much the dearest in the end.

5. Good cards mean longer life, cleaner indexes, and quick reference.

The qualities of material used for record and guide cards may consist of any of the following:—Bristol board, cardboard, pulp-board, manilla board, paste-board, and ivory board, the last two qualities not being recommended for card index work. The characteristics of each will be dealt with in the next chapter, when means for distinction and detection will also be touched upon.

In conclusion it may be remarked that the aspiring stationer cannot perform a better service for himself than to become thoroughly acquainted with the intricacies of the loose leaf ledger and card indexing and filing systems now on the market. To the specialist in such matters, there is ample scope, and with the

increasing sale and use of the systems, the demand for thoroughly competent experts in salesmanship of these goods has opened out some fine opportunities.

## CHAPTER XI.

### BOARDS FOR CARD INDEX SYSTEMS, &c.

Quite a variety of different styles of card and board are used in the preparation of material for filing systems. Naturally enough, certain types of system call for highest quality, others for cheapness; or again, certain inherent characteristics are requisite for special purposes. Hence it is necessary to cover quite a wide range of qualities and grades in order to meet the various demands. It is incumbent upon the stationer to be well acquainted with the peculiar characteristics of the cards and boards he is likely to come in contact with. The grades we will here refer to are pulpboard, cardboard, bristol board, manilla board, pasteboard and ivory board, most of which are largely used for filing systems.

#### PULPBOARDS.

Pulpboards may be very cheap or very dear, according to the class of material used in the manufacture. Unlike pasteboard, pulpboard, when torn, shows an interior of consistent colour with the outside, and furthermore, when held up against light and looked through, it appears translucent (not transparent).

Pasteboard under similar conditions appears opaque. Pulpboard is manufactured in the single sheet for thin and middle substances, or several layers for stout substances, but in any case the material throughout is identical. Folding is readily performed with or without scoring, and no broken edge results. Moreover, pulpboard cuts cleanly and sharp, without a woolly edge. The wear and tear depends largely upon the quality, which may be judged by resistant tear and pure look-through. The surface should be very uniform and



smooth, making pen writing, or even fine printing, an easy matter. By tinting the pulp, coloured boards are produced, whereas coloured pasteboards are dependent on the exterior only, the inside still remaining grey middles.

#### CARDBOARDS.

Cardboards are a superior quality, either of pasteboard or pulpboard, being formed of several layers, and consequently offering opportunity to use either all one quality pulp, or inferior insides. The higher grades are consistent throughout and are well rolled to offer a firm, crisp handling product. Good quality cardboard shows a more opaque look-through than pulpboard, being composed of more than one layer, whereas pulpboard usually consists of one layer only. Again, cardboard is much stronger and harder, offering a good ink writing surface which will bear erasure. The tear should show a clean interior, and folding should be performed without much show of breaking, although it is necessary for neatness to score the board.

Where strength is particularly desired as a leading quality in a grade of cardboard, the interior is sometimes composed of cartridge stock, i.e., the material from which the cheaper qualities of tough drawing paper are made. The slightly toned colour of this interior offers a ready means of identification. For still higher grades, white drawing may be resorted to, in which case the purity of colour and length of fibre will be noticeable in the interior on tearing.

#### BRISTOL BOARDS.

It may be here remarked that ivory boards may be had with matt or dull finish, but this is a recent innovation and somewhat transgresses the original term. Bristol boards form the toughest, strongest, most durable and most expensive material resorted to for the manufacture of cards, &c., for index systems. The

corners rarely break, never split into sections, and small cards have an exceedingly long life. When laying against one another, ivory cards have a tendency to show the writing through from back cards, owing to the high degree of transparency. Bristol boards have no such tendency, except in exceedingly thin and well polished samples. In reality, Bristol board is a very high quality of cardboard, consisting of good white middles and best drawing paper outsides or pastes. Sometimes Bristol boards are composed of two or more sheets pasted together, in such cases the substance being governed by the number of sheets.

#### MANILLA BOARDS.

A class of board is used in the manufacture of guide cards, known as manilla board, usually buff, sometimes coloured. If genuine the material from which they are made should be manilla hemp. This is about the strongest fibre known, but does not give a good white colour, hence the buff or unbleached nature of the colour. Rarely is the genuine fibre used however, wood pulp of long fibre taking its place, being dyed to colour, half-bleached, or left unbleached. In any case, great strength is the keynote of the product. When coloured it is essential that the dye be fairly fast owing to the length of time the guide cards should remain in use. The function of the guide card calls for great thickness and stoutness, hence it is usual to paste two or three thicknesses of manilla board together. Ordinary coloured stock may be pasted to the outside, and high quality natural coloured board for the foundation or middle.

#### PASTEBOARDS.

Pasteboard is the cheapest grade, although the price is largely dependent upon the quality of the middles. If a piece of pasteboard is torn so as to show plenty interior, it will always be observed that the surfaces are

much whiter than the inside. As the name implies, the outside white sheets are pasted on to an inferior quality (or grey) middle. The mode of manufacture is to produce the cheap middle on a continuous board machine. This machine somewhat resembles the Fourdrinier paper-making machine, except that no travelling wire is needed. Instead, a set of wire covered cylinders is used, varying in number according to the thickness of card or middle it is intended to produce. These cylinder moulds each pick up and carry forward a web of pulp, the various webs uniting and passing under very heavy press rolls, which compress the units into a solid sheet. This is then dried over heated cylinders in the usual way.

There is another method by which single sheets of middles (or millboards, boxboards, &c.), are produced. This consists in using the single board machine, in which case a single cylinder revolves, partly dipping in the pulp mixture. The wire mould covering the cylinder picks up and carries round a film of pulp, the water being admitted through the wire and carried away. The fibrous sheet is transferred from the wire on to a travelling felt and re-transferred again to a top felt. Several layers are deposited until the desired thickness is attained, when the sheets are pressed and glazed to requirement, or left unglazed in the case of middles. Obviously, the continuous method is the cheapest and quickest, although the thickness to be obtained is a chief factor. By the continuous machine method the outer sheets of good white quality printing are added to the middles, thus producing pasteboard. All pasteboards are therefore detected by the dirty interior on tearing. The old terms of thickness, as 3-sheet, 4-sheet, and so on up to 12-sheet, merely indicated substance and did not refer in any way to a specific number of sheets in the make-up. Pasteboard, or triplex, as it is also called, will not fold without cracking considerably, even if scored. The resistance to wear and



tear is very low, for the corners and edges speedily split and become ragged.

Pasteboards should not be used for card index work except under compulsion. Pulpboards are much more successful.

#### IVORY BOARDS.

Far more elegant than any of the classes of board hitherto mentioned is the grade known as Ivory Board. Compared with pasteboards or pulpboards the ivory board is as much an aristocrat as plate paper is when compared with super-calendered printing. According to substance, ivory boards may be produced in single layers or pasted doubles. The superfine double or extra thick grades are more often produced by pasting single sheets together and rolling. The edges of the boards often show an overlap of one or other of the layers. The essentials in an ivory board are transparency in a high degree, clarity of colour, perfect evenness of surface and brilliancy of polish.

The polish and transparency are imparted by finishing the sheets through heavy steel rolls, the surfaces of which are bees-waxed. Compared with pulpboards ivory boards are far more transparent, much harder, and more highly glossed. Held to light, the look-through is pure and causes pulpboard by comparison to appear dull and almost dirty. Owing to the hardness of the boards, folding occasionally presents a difficulty, due to the danger of cracking. Scoring must always be resorted to, to help the process and give a perfectly clean fold. Very similar, but even higher class than Ivory, is the grade known as bristol board, so called because it is said to have been first introduced at Bristol. This quality is not so transparent as ivory board, and usually possesses a duller finish, being occasionally matt textured.

## CHAPTER XII.

## BUSINESS AND VISITING CARDS.

A very large and profitable business is done amongst stationers and printers in business and visiting cards, the latter being variously termed calling or compliment cards. The wholesaler is concerned in supplying the blanks, whilst the retail stationer or printer sells out the goods in small quantities printed in certain styles.

In discussing the points of interest in this line of goods, it is advisable to treat the subject under two heads, first of cards and secondly of printing methods. Accordingly, the first consideration will be devoted to the qualities, sizes, uses, and customs of visiting and business cards.

As a rule they are cut from ivory boards, hence are termed ivory cards, but there are occasional lines on the market (particularly special offers and jobs) which have been produced from pulp board. The ivory card is readily detected from the cheap pulp card by its extra degree of hardness, and particularly by its translucency, a property which is not shared by cheap cards. Further, the good quality card has a brisk crackle or rattle and very tenacious tear. A pulp or cheap ivory card tears with an easy softness. The look-through of the two grades differs vastly, for while pulp or inefficient ivory cards appear muddy and obscure, the real ivory quality seems transparent, clear and pearly. The grade of an ivory card may be judged by the following characteristics: The colour or tone should be pure and bright, the look-through quite devoid of wire marks, specks, clots or defects of any sort whatever. The tear should be extremely strong and slow; both sides of the card must be perfectly even and free from the wiremarks of the paper-making machine, while the rattle and general feel should be rigid, tinlike and sharp. Extremely important is it that the edges be absolutely free from burr, a defect of this description being quite sufficient

ground for rejection of the goods. Thickness is more a matter of personal taste, most qualities being produced in thick and thin. As a rule gentlemen's cards and business cards are preferred thick, whilst ladies are best suited by the thin grades, so long as they possess the necessary firmness.

#### THE TONE OF CARDS.

The matter of tone or shade of whiteness is rather important in the case of the better class cards. Usually the division is into two tones, cream and blue, the former predominating in use. Pink and pure white tones are also produced, and it is absolutely essential in high grade goods that not the slightest suspicion of deviation from standard tone should ever occur. Apart from white cards there is, of course, a small but declining demand for tinted calling and business cards, the stocking of which becomes a rather speculative matter.

Until recently the ordinary types of card were produced with the usual smooth finish. Now, however, the matt-finished style of card is preferred by a number of users. The matt finish is decidedly artistic, so long as the ultimate printing is performed direct from copperplate or steel die. Lithography or letterpress printing produces inferior effects on the slightly roughened surface.

The stationer should be thoroughly conversant with the sizes and uses of cards, not requiring to measure a pack before he can quote the dimensions. The following table covers the usual sizes:—

Thirds—3 in. by  $1\frac{1}{2}$  in.

Extra Thirds—3 in. by  $1\frac{3}{4}$  in.

Town—3 in. by 2 in.

Reduced Small— $3\frac{9}{16}$  in. by  $2\frac{5}{16}$  in. and  $3\frac{1}{2}$  in. by  $2\frac{1}{8}$  in.

Small— $3\frac{5}{8}$  in. by  $2\frac{3}{8}$  in.

Double Small— $4\frac{1}{4}$  in. by  $3\frac{5}{8}$  in.

Large— $4\frac{1}{2}$  in. by 3 in.



Double Large—6 in. by  $4\frac{1}{2}$  in.

Correspondence— $4\frac{1}{2}$  in. by  $3\frac{1}{2}$  in.

Thirds are used for gentlemen's cards with name only, or one and two-line address. The name indicates that the card is one-third the size of "large." Extra thirds are the same width as thirds, but a little extra in the depth; they are chiefly useful for gentlemen's name and two or three-line address, also for representative's cards with firm's name at foot, telephone number, &c. Town size, which is the same width but still deeper, is used for business cards, and is often preferred as a smaller size for ladies' cards. The same applies to reduced smalls. Small is the standard size card for ladies, while large is the recognised size for business cards, bearing full particulars of the firm's style and purpose, with representative's name at the foot. Correspondence cards are used for a variety of domestic and business purposes, including announcements of all kinds, private messages, greetings, return thanks, invitations, &c., whilst private families largely use them instead of post-cards, crest and address being stamped in suitable colour and position.

While the orthodox calling card is plain, straight-edged, square-cornered, and white, there is also a variety of styles produced to meet occasional and individual requirements. The following types are always to be had: Imitation or real gilt bevelled-edge cards with round or square corners, plain-edged cards with round corners, black-bordered cards, imitation or real hand-made, natural deckled-edge cards, ordinary cut-out cards. The latter types are rarely used nowadays for calling cards, but, of course, there is a tremendous demand for them for admission tickets and general use.

#### TRADE CUSTOMS.

Connected with cards there are the usual customs of the trade, which might and probably soon will be standardised. A packet of cards contains 52, consti-

tuting presumably 50, and a top and bottom for wastes. Whether packed in paper or boxed is obviously a matter of price, but paper wrappings tend to rapid depreciation, unless the stock is constantly moving. The boxes or packs of 50 (really 52) are further made up in parcels of 1,000 (really 1,040), except in the case of certain manufacturers who still carry out the old and useless custom of packing their cards in dozens, i.e., a dozen packs of 50 (52) cards, making a parcel of 600 (624). Like the 472 and 480 sheets to ream custom, it is quite time this method was done away with. Calculations on dozen packs are troublesome, and parcels have to be broken to make 1,000's or set multiples of even figures. Of course, the wholesaler sells in parcels without breaking, but to the retailer such a course is impossible, with the result that very few parcels on the shelves are unbroken. Further, a mixture of dozens and thousands is a great nuisance in stock-taking, necessitating extra trouble and risk of error. Until such time as the dozen packs custom becomes obsolete, the following table of conversion in price from dozen packs to 1,000's will form a ready reference for the stationer who handles both varieties:—

Price per 1,000	Price per Doz. Packs.	Price per 1,000	Price per Doz. Packs.	Price per 1,000	Price per Doz. Packs.
1 0	0 $7\frac{1}{4}$	3 3	1 $11\frac{1}{2}$	6 0	3 $7\frac{1}{4}$
1 3	0 9	3 6	2 $1\frac{1}{4}$	6 6	3 11
1 6	0 11	3 9	2 3	7 0	4 $2\frac{1}{2}$
1 9	1 $0\frac{3}{4}$	4 0	2 5	7 6	4 6
2 0	1 $2\frac{1}{2}$	4 3	2 $6\frac{3}{4}$	8 0	4 $9\frac{3}{4}$
2 3	1 $4\frac{1}{4}$	4 6	2 $8\frac{1}{2}$	8 6	5 $1\frac{1}{4}$
2 6	1 6	4 9	2 $10\frac{1}{4}$	9 0	5 5
2 9	1 8	5 0	3 0	9 6	5 $8\frac{1}{2}$
3 0	1 $9\frac{3}{4}$	5 6	3 $3\frac{3}{4}$	10 0	6 0

It may be observed in passing that the custom of adding two extra cards for waste to each 50 does not always follow in the case of job lots or waste cards.

## STYLES OF PRINTING.

Turning now to the prevailing modes of card printing, there are four distinct styles, namely, letterpress, lithographic, plate printing, and die stamping. The first named is performed direct from ordinary type on a small platen or card-printing machine. It is a cheap and commonplace method of producing the work, but is the only way in which the little stationer is able to carry out his announcement of "cards while you wait." Letterpress printed cards may be detected by the separated letters, the impression or indent on the back, and generally the blotchy and uneven appearance of the printing. Special type faces have, of course, been devised for this class of work, but they speedily wear and produce worn-out and filled-up impressions. A better class of card printing at slightly higher cost is performed by lithography. This method is useful when a client requires a small job at fairly low cost, but better than letterpress, which will not require to be repeated. The lettering is designed and written on special transfer paper by a lithographic artist, hence any style of letter may be chosen. The writing is then laid down to stone in the usual way and the impression transferred to the cards singly through the press. Cards printed in this manner may be detected by the lack of impression on the back, the flatness of printing on the face, and the joining of the letters as in ordinary hand-writing. Added to this, there is the usual freedom of contour inseparable from handwork.

Lithographic card printing is not always performed from a writing, being just as readily and more cheaply done from copper-plate transfer. If a copper-plate contains more matter than is required on the card, or if certain additions are required on the card but not on the plate, cut-away transfers or combinations of plate transfer and writing may be laid down to stone and lithographed in the usual way.



## DIRECT PRINTING AND STAMPING.

The high-class card, however, is usually printed direct from plate. A copper-plate is engraved with the required matter or design, in any style, and the cards are printed one at a time direct from the plate. The method is known as direct plate printing, and the routine consists of inking in the incised cuts on the plate with special ink, wiping away the surplus and smoothing off the plate surface. Then the card is placed on the plate, a felt over the card, and the lot pulled through a copper-plate press. This operation is repeated for every card. The printing is characterised by intensity of blackness, a raised impression (which may be felt by passing the fingers over the surface) and perfect sharpness of line in the letters. Alterations may at any time be made on the copper-plate, and with careful use the plates last very many years.

Die stamping is similar in many respects to plate printing, but is usually to be distinguished by a characteristic gloss on the dried ink. Instead of copper, steel is necessary, and the letters or designs are punched in before hardening the metal. Instead of punching, the letters, &c., may be engraved, but the former is the most approved method. For small editions of ordinary cards steel dies are too costly.

It is in the case of medium or large quantities of cards bearing a fair amount of matter that steel die-stamping proves useful. The printing is performed by power presses at a high rate of speed, inking in, wiping and stamping being mechanically effected. The gloss which may be imparted to the ink or impression is very much admired by many people. Perhaps the greatest fault, and certainly the most distinguishing feature of die-stamped work, is the sunken-in impression on the back of the card, while the surface shows a decided glaze created by the heat and polish of the die face.

## CHAPTER XIII.

## STOCK-KEEPING AND RECORDING.

A paper store may be large or small according to the scope of the shop or factory to which it is attached, but either way it must be conceded as an indisputable fact that the content of a paper store is on a par in value with that of the plant in the various departments. On this basis alone it is reasonable to assume that equal care and consideration should be accorded to the paper store as to the working departments. Unfortunately, the establishments which run their paper store on orderly and systematic lines are quite in the minority. The elementary fact stated in the opening sentence of this chapter is overlooked or unrecognised. There is another viewpoint which was perhaps of temporary attraction during the war, i.e., the paper store is the most profitable and secure department in any printing works or stationery establishment. Printing costs and the cost of producing stationery may be difficult to define with scientific accuracy over varying periods, but the cost of maintaining a paper store is simplicity itself. Granted efficient buying and ordinary care in warehousing, the profits are real and easy to secure. So much cannot be said of labour production. It is the more surprising therefore to find that in many otherwise progressive establishments the paper store is allowed to run its own course with no particular effort to conduct it on either systematic or scientific lines of management.

Under such lack of guidance deterioration becomes rife, losses accrue, leakages constantly occur, and instead of figuring as the safe profit line of the establishment the paper store becomes an object of concern, or unconcern as the case may be.

There are set lines along which the stockroom should be planned, systematised and conducted, as will be shown in the subsequent paragraphs.

In regard to the planning of the space, much depends upon the size and nature of the establishment. In the

first place the room selected for containing paper should be entirely free from damp and leaks. Top floors frequently have the advantage of comparative dryness and good light, but in old buildings there may be defective roofing, window frames or skylights which in adverse weather conditions may permit the entrance of rain, or especially thawing snow, with consequent damage to stock. Damp of any kind is the great enemy of all classes of paper and should be rigidly avoided. Where paper is stored for colour printing it is not too much to insist upon an attempt to control the atmospheric condition of the paper store. With the aid of a thermometer, hygrometer and ordinary means of heating and ventilation it is easily possible to consistently maintain the appropriate conditions of humidity and heat. These may be briefly stated as approximating to 65 per cent. moisture saturation of air, which corresponds to 7 per cent. moisture in the paper (the normal content) and 60 to 65 degrees Fahrenheit at which temperature paper assumes and maintains a state of maturity.

In regard to the planning of racks, shelving, &c., the arrangement is decided by the volume and character of stock carried. For large quantities of flat sizes, still-ages, built a few inches from the floor are preferable. The space allowed beneath the paper prevents it being kicked or damped during floor sweeping, while it also facilitates ventilation. Small amounts of flat papers are more suitably stored in racks solidly built, with flat shelving running parallel to the direction in which the reams are inserted. Joints should be morticed in preference to stays or ribs which consume space and present an obstacle to top reams. Ample marginal space should be allowed for the different sizes of paper, to facilitate easy and speedy handling. Skeleton racks have no recommendation save cheapness, and should be avoided on account of the damage caused to the bottom reams of paper which sag into the spaces between the laths and receive thereby an irremediable impression.



Regarding the conducting and control of the store, one person should be made responsible for efficiency and he should have the power to prevent any person interfering with the stock. Without keen supervision wanton damage will result from the indiscriminate abstraction of samples and sample pieces torn from any particular ream or parcel. Untidiness and exposure are the hall marks of neglectful control.

Granted a capable man in charge, it remains for him to consistently maintain an efficient system. Running briefly over some of the ways in which this may be accomplished, take first the recording of purchases. There should be a paper purchase book into which all invoices are copied as they arrive, and the summary of buying totals extended monthly and yearly. During the rationing and for some months to come there will also be recorded on the index card system the weight of paper and boards in lbs., bought during the official period from each particular mill or agent, &c. In the goods receiving department a Goods Received book will be maintained by the person in charge, who should enter therein the date and time of receiving, the number of parcels (and contents if known), consigners' name and Railway Co. or carrier, with indication as to whether carriage is paid or forward.

These books and records dispose of the elements of buying and receiving. A more detailed system is now essential in order to record the consumption of the stock. It is imperative that a complete check should be maintained on the usage of every quire, if not every sheet of paper. In addition the exigencies of modern business demand that data should be available to yield at any moment the approximate if not actual value of stock held; the duration of any particular line of stock; the amount and position of any given grade; the turnover of capital, and the complete detail regarding purchase.

To achieve these objects any one of several methods may be employed. The one recommended by the Master

Printers' Federation, for use in the official scheme of costing is to maintain a book termed a Paper Stock Ledger, into which full particulars of paper bought are entered upon receipt. A separate leaf is maintained for each item of stock and a loose leaf book is recommended as the approved style. Index leaves divide the different classes or grades, as azure woves, yellow laids, creams and so forth, while a detailed index is posted up at the front of the book. Full particulars of maker, quantity, specification, price and location of stock are entered at the head of each page. The remaining space is ruled off for posting the amounts received and the paper issued, carrying forward the total reamage and the total costs to a balance. Naturally this book must work in conjunction with a daily docket filled in by the warehouseman, giving the necessary details of paper issued, number of job, name of customer, &c.

Accepting the principle of the foregoing scheme, a decided improvement may be effected by composing the leaves of the books from actual sheets of the particular paper or board denoted. By this method the Paper Stock Ledger becomes a sample book and saves labour and expense in reference. The mutilation and derangement of stock is avoided and instant selection of paper from actual samples of current stock may be made. Further, the colours, qualities and substances of the samples are a self-made index and guide for posting-up purposes.

The last method to be described is that based on the card index principle, in which 6 by 4 index cards are posted up on the same lines as the loose leaf sheets. The card is ruled with a heading to take full particulars of dates and amounts received, sheets to ream, maker, quality, size, price, discounts, total value and all other data pertaining to the purchase and balance of old stock. The body of the card and reverse side is ruled to take date, job number, amount of paper issued, and total value. Guiders are used to index the various grades

of stock, or the cards may be divided according to the location of the stock, as by rack, stillage, or shelf number. In any case all racks, &c., should be numbered off and the position of stock noted on the index cards.

Whatever method is employed, the total value of paper issued each day should be posted to a summary, whereby an efficient check on paper usage or spoilage, and stocktaking may be easily maintained. Individual values of stock issued are, of course, posted daily to the job cost sheets concerned.

The advantages of running a paper stock room on orderly and systematic lines are, that the standing value of the stock can be correctly and speedily ascertained at any given time, the charging up of paper stock may be checked against the actual value consumed, the buying of paper may be scientifically kept under control, and old or odd lines of stock are constantly under view, thus facilitating their speedy disposal.



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88















