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PRODUCTION

IN ADVERTISING

AND THE GRAPHIC ARTS

BY DAVID HYMES

THE COLLEGE OF THE CITY OF NEW YORK

HENRY HOLT and COMPANY • New York

to FELICE

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PREFACE

Advertising today is the educational procedure of informing the vast consumer and industrial market of the merits of the products and services of American industry.

Advertising helps sell the product, thereby giving labor and management a greater opportunity for expansion. This continuing expansion is responsible for a better way of life, synonymous with American ideals and democracy.

Since the success of advertising plays an important part in our lives, it must be produced by men of wisdom and know-how. Production men with these aspects are the backbone of the advertising profession. Their knowledge supported by the craftsmen in the techniques of the graphic arts produce, with *quality, speed,* and *economy,* the ideas of men in advertising.

It is the objective aim of this book to give a practical working knowledge of production to all interested in advertising, from the beginner to the executive in production and management. It is designed to serve as a liaison between the graphic arts and the advertising professions. It will explain and illustrate clearly and concisely each tool of advertising production: how it is used; why it is used; when it is used; where it is used.

The various chapters, from layout to the final step in production, provide the reader with a definite concept in production procedures. The subject of typography is treated most elaborately, thereby placing the book as a ready reference for art directors, copywriters, layout men, journalists, and production men. Photoengraving holds an important place for all those interested in reproduction in both black and white and color. Every phase of printing is carefully analyzed, giving the student not only the technical aspects but useful and practical hints for better printing. Finally, a valuable insert of various printed paper samples illustrates the performance of paper in advertising.

Knowledge is not enough for success in your work; wisdom must be applied concurrently. To be an expert or specialist, a man needs more

than practical techniques. He needs a deep understanding and comprehension of his fellow men with whom he works and with whom he does business. The craftsmen who translate your instructions into the printed page have abilities based on long apprenticeships. Recognition and respect for their talents united with your cooperation will insure the wholesome working relationship so necessary for the performance of the best possible job. Understanding this primary objective is the first step toward wisdom.

New York March, 1958 D.H.

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1

ADVERTISING ART

ART

Success for the production man may be measured directly in relation to his knowledge of layout techniques and to the scope of his understanding of how, when, and where to use specific types of art work in different advertising media.

True, the production man usually does not buy art work. Most often that is the responsibility of the art director. However, it is the production manager's responsibility to have a comprehensive command of layout techniques and the application of different types of art work to the limitations of the platemaking and printing processes. Only then can he reconcile the essential factors of budget, time, and mechanical characteristics to the successful conclusion of a job.

For an intelligent and cordial working relationship with his art department, the production man should be thoroughly familiar with the following discussions and definitions, here divided into eight categories: layout, color, art media, shading media, photography, photocopying, scaling, and commonly used terms.

LAYOUT

Types of Layouts. Regardless of the medium used, an advertisement always competes for attention with others. In any issue of a popular magazine, fifty to one hundred different advertisements compete for the attention of the reader. Subway posters, car cards, billboards, and outdoor spectaculars all maneuver and elbow each other to attract the conditioned and disinterested eyes of consumers. And, likewise, direct mail pieces pile high on office desks and in home mailboxes waiting for early consignment to waste baskets—unopened.

Wasteful? Perhaps for some. But certainly not for the advertiser whose

staff appreciates the sales value of attractive layouts in their advertising.

There is an old adage that says, "The first impression is the lasting one." In advertising, layout conveys that essential first impression. A fresh, clean layout invites readers to get acquainted with the message, the product, and the company. Conversely, an ill-appearing, unbalanced layout can only invite readers to turn the page.

Therefore, the importance of good layouts cannot be overemphasized: to attract readers to a specific advertisement in a competitive setting; to create a favorable, friendly impression upon potential buyers of the product.

All layouts fall into two categories: formal and informal, which are also referred to as classic and romantic (Fig. 1–1).

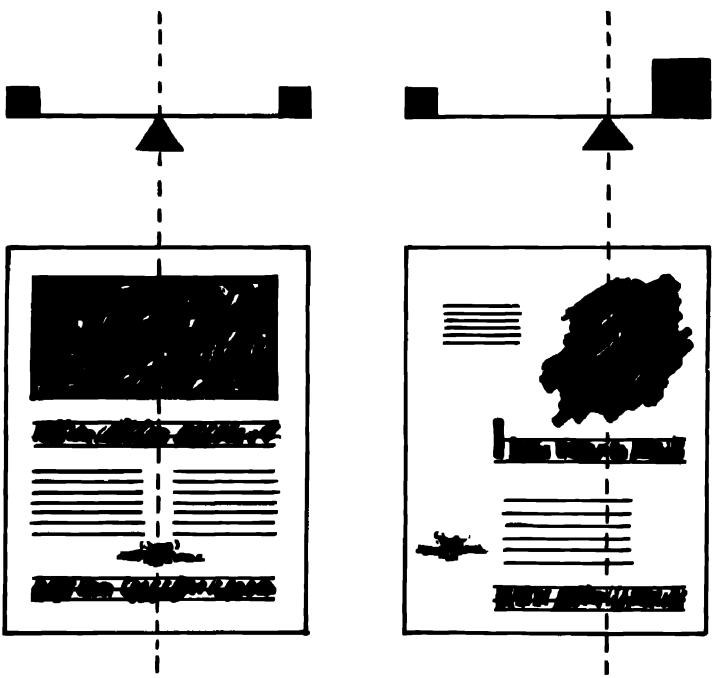


Fig. 1–1. Layout. (*Left*) classic or formal layout; (*right*) romantic or informal layout.

The formal, or classic, is one in which the entire arrangement balances on a central vertical axis. It is symmetrical.

The informal, or romantic, type is one in which balance is obtained by counterweighting masses. For example, using a steel yard as a scale, balance can be obtained between two masses by shifting the fulcrum one way or the other. The fulcrum represents the vertical center of the layout and the masses are the units to be balanced. As the vertical

center is always a fixed line, it is necessary to shift the masses. A large mass placed near the center can easily be balanced by a smaller one placed at a greater distance from the center. There is no direct formula to govern this arrangement. The balance is obtained purely by eye, and must be acquired through practice.

All laws of balance in regard to composition and design in illustration can be directly applied to layout work.

A few points which govern balance are as follows:

1. Color, mass, and shape are first to be considered.
2. Type matter is always represented as an area of gray.
3. A composition with a large mass on the top and a smaller one on the bottom should be avoided, as it will be divided and top-heavy.
4. A mass of color in one part of the layout should carry a counterpart or echo in another to obtain balance.
5. The size and shape of the page, the type of magazine, the positions of the date, name, and page numeral also enter into the composition of the arrangement. Inattention to any of these items may ruin a perfectly balanced layout.

Today's layout artists derive their patterns for the *classic* layout from the orthodox laws of design applied by the early Greeks to their architecture and fine arts. When an advertisement must convey the qualities of elegance, dignity, stability, and refinement, the classic layout usually is in order. The *romantic* layout, however, symbolizes a modern informality, a freedom of mood and style. Both product and market must be studied carefully before deciding the most suitable layout.

The Use of Black-and-White Spaces. The layout man must be concerned with achieving emphasis for particular portions of the message to be conveyed. The proper use of white space is one of the most important means of achieving this goal, and is, therefore, one of the most vital concerns of the layout man.

Glance through any magazine of your choice. Undoubtedly, you will be most attracted by those advertisements in which the balance of white space to copy and art arrests and pleases the eye. It is only after this first good impression has been achieved that you will stop to read the message. Your eyes have separated the wheat from the chaff. Unknowingly, you have selected the well-balanced advertisement from its cluttered neighbors. Thus, the layout man, taking advantage of his opportunities by the proper use of white space, has actually multiplied the value of the advertisement, without the additional cost of space to the advertiser. He has, in effect, increased the size of the advertisement by using white space to free it from the environs of the printed page. There is no substitute for the general aura of good taste, dignity, simplicity,

cleanliness, and individuality which the discriminating use of white space will give to an advertisement.

More often today than ever before, layout men are convincing advertisers of the adverse effect of cluttered and crowded advertisements. Squeezing every last word of copy into every available inch of space is not only poor taste but also poor policy, since it tends to make reading difficult, thereby destroying the product message. Fortunately, crowded advertisements, although once the rule rather than the exception, are rapidly disappearing.

When used discreetly and in proper balance, black offers the most powerful possible contrast against a white background. Black makes the white space appear whiter, while acting as the point of emphasis and the attention-getting mechanism. Jewelry and silverware displays, especially, are enhanced against a black background and become brilliant in contrast. Black also is often used effectively as a binder for related groups of articles. And when decorative and attractive designs boldly executed are desired, black can be depended upon to do the trick. Outstanding, too, are logotypes of trade-marks set against a black background.

Emphasis. In all of the visual communication arts, each work or group of items must center around a specific focal point that establishes a primary point of interest from which all else in the composition emanates. This holds true for the fine arts, the purely decorative arts, and, of course, the advertising arts. The focus of interest is obtained by emphasis.

Since emphasis derives from selectivity, it is obvious that the selection of too many elements to attract attention will result only in confusion and monotony. The major purpose of emphasis is destroyed if too many elements in a layout shriek for attention. The reader is confronted with conflict about where to look first and so may miss the single most important message. One element must stand out above all others. There should be no competition for immediate attention. All other elements in the advertisement must be subordinated.

Size, color, the proper use of black-and-white spaces, and spotlighting are some of the various ways to obtain emphasis. Because of the expense of engraving color plates, color is used less frequently to achieve emphasis. Also, the use of color is fraught with many dangers, the most wasteful being overabundance. A gaudy and too plentiful use of color deletes its effectiveness and defeats its purpose.

To convey the desired message or concept instantly, it is necessary to emphasize one of the five elements of a layout, while subordinating the other elements. Virtually every layout contains these five elements:

heading, text, logotype, illustration, and trade-mark. By fortifying any one of these elements with major importance, while declining the emphasis of the other elements in accordance with their relative importance, instantaneous attention is brought to the desired element. Emphasis might be rendered by large-size hand-lettering, underlining (although this is considered in poor taste today), or by the use of a heavy type or italics.

The spotlighting technique is becoming ever more popular in the mass circulation general magazines. Spotlighted illustrations focus attention upon the advertised product by providing a close-up of the subject, while the background sketchily introduces local color. Since the reader is free to imagine the product being used in a multiplicity of ways, the spotlighting technique has proved very effective.

Color. The strongest of the attention-getting devices is the use of color for emphasis. However, since cost is very often a determining factor in advertising, the use of color is limited in comparison to black and white.

The entire spectrum of the rainbow and beyond can now be achieved in print materials to give realism to virtually every product. Color itself has an intrinsic appeal to people of all ages. And so color on its own merit serves to attract readers to an advertisement. Color is effective in stimulating the desire to possess, because people can translate a product represented in color into its desired position in their own homes. Visualize a color advertisement of house furnishings as a perfect example. Or imagine the appetite stimulation of foodstuffs rendered in color. Or picture yourself with the satisfied sensation of ownership of wearing apparel, furniture, automobiles, boats, or countless other items of consumer goods, all given immediate impetus when depicted in color.

Perhaps the best means of achieving association and identification is through the use of color. It is easier to identify a product on a store shelf when it has been realistically rendered in color in a magazine or other print medium. This becomes important because product identification at the point of purchase is essential to the impulse to buy. Color, too, is used to achieve continuity in advertising. A specific style in the use of color displayed repeatedly to the consumer establishes that particular style and color as landmarks of immediate identity for the product. (See Appendix 1, H.)

Psychologically, color is a peculiar stimulant. Different colors and color combinations are known to arouse specific emotions. Warmth or cold may be represented by color. Reds, yellows, and browns create an aura of warmth, while blues, greens, and grays relate various degrees of cold. Colors also have feminine and masculine associations. Therefore, an

audience of a specific sex may be attracted to an advertisement and product merely by virtue of the use of the proper color.

Pictorial Emphasis. To develop unique and attractive illustrations, the layout man must call upon every aspect of his creative imagination.

The truly creative man today has more license and freedom of expression than his formula-ridden forebears in advertising. The spirit of modernism is in vogue with the accepted use of a variety of angular shapes, weird and contrasting shadows, and fanciful perspectives. However high our standard of education in America has become, we must still take care not to exceed the limits of the layman's imagination. The use of baffling ultramodern art may alienate the consumer rather than attract him. Therefore, although our modern concepts must continue to progress, we should scale our imaginative photographs and illustrations no higher than the level of understanding of our audience.

Sharp angles and foreshortening are in common use as acute perspectives to achieve effective emphasis. Both the worm's-eye view and the bird's-eye view have gained stature as important means toward emphasis. The worm's-eye view provides dramatic emphasis for the desired object, while maintaining all other objects in their relative importance. The object in the foreground looms up large in relation to the background objects which are reduced in size because of the low eye level or horizon. The bird's-eye view, however, sweeps the countryside with a broad perception of virtually everything as far as the eye can see, i.e., buildings, real estate properties, and everything between the viewer and the horizon. Rapidly converging lines may create a sensation of great height or depth. However, here it is necessary to show a third vanishing point, either above or below the eye level.

Symmetry. Regular arrangement of parts across a given axis, so that a division through that axis will divide the whole into halves, is called symmetry. A type design is said to be symmetrical when, after a line is drawn through it from top to bottom, each type line is divided in half, thus leaving equal type masses on both sides.

COLOR

Color is that property of light which causes objects to present different appearances to the eye. Actually, there are only six colors: three primary —red, blue, and yellow; and three secondary—orange, violet, and green. All other colors are compounds of these.

Artistically speaking, yellow and orange symbolize light and gaiety. Red, aggressive and the most popular of all colors, speaks of heat and energy. Blue is exactly the opposite; it suggests cold and snow, is soothing and constraining. Steel-gray symbolizes weight and solidity; purple

means pomp and power; black, sobriety and mourning; brown, bitterness; green, life and growth—sometimes envy; gold means prosperity.

The following terms must be understood before the description of any given color tone can be fully comprehended:

1. Hue denotes the name of a color as blue, greenish-blue, red, etc. To alter the hue of a color, another color must be mixed with the original color.

2. Value is the relation of a color to white or black. For example, light blue would signify a blue that is higher in value than the normal spectrum blue; dark blue would be a lower value. To change the value of a color, a lighter or darker color must be mixed with it. Black or white will change the value, but not the hue. White raises the value; black lowers it.

3. Intensity is the color strength of hues as compared with colorless gray. The comparison between brilliant blue and dull blue shows the difference in intensity between the two hues. A grayer quality mixed with any given color will alter its intensity, not the value or the hue.

In advertising, color serves five major functions:

1. *Attention value.* Where black and white may fail, color will catch the eye and hold it, if used properly. However, since color is so compelling, it can also prove distracting, and special care must be taken in the correct application of color in the layout. It should be used simply and appropriately, tied in to hold the advertisement together. It should invite readership, and result in sales.

2. *Realism.* In the display of certain products, color is of primary importance for factualness with a tinge of glorification. For describing dimensions in an illustration, color can be more effective than words.

3. *Identity.* Words or symbols are not as easily retained in the memory as is color. Therefore, color has been persistently and successfully applied to build up recognition of a product.

4. *Psychology.* Because of the many mental and emotional associations of color, it can be used subtly and effectively to imply warmth, coolness, cleanliness, edibility, weight, the months and seasons of the year, closeness and distance.

5. *Beauty.* Whether or not it has any direct bearing on the copy message, color will command interest in drawings or photographs. This intrinsic appeal is clearly distinct from attention value, and its application requires cleverness and strategy in order to result in effective advertising.

ART MEDIA

Following are descriptions of each of the more commonly used art techniques.

Aquatint. Aquatints are soft-tone values, similar to wash drawings. When the metal of the plate is covered with a powder or liquid resin which dries and sticks to the surface, thousands of small holes are left exposing the metal. By etching the plate in acid, the design is created right on the metal.

Briefly, the technique consists of etching, stopping out parts which are deep enough, etching again, stopping, etc. Done through the plate's grainy coating, the etching results in a soft, finely grained picture.

Casein. Caseins are opaque colors applied in the manner of water colors or oils but are quick-drying and enable artists to work rapidly. Modern casein is easy to handle and stays soft in the tube. It is a versatile pigment adaptable to a wide range of techniques and finishes, varying from matte to glossy.

Charcoal. Drawings made with charcoal on smooth paper yield soft tones, delicately blended. Halftone reproduction is recommended. Charcoal work on rough board is more contrasty with stronger blacks, clearer whites. It can be reproduced by zinc line cuts.

Crayon Drawing. The crayon drawing is an old technique which provides a rich and individual effect. Usually a crayon drawing is made on a paper or board with a slight tooth or textured surface, such as Ross board or Coquille board. Either paper lends itself satisfactorily to the crayon for good reproduction as line copy. Softer and smoother techniques in crayon make good halftone copy, with the dead-block areas broken up into a screen dot. Striking effects may be created with the crayon when emphasis is wanted in part of the art copy.

Colored crayons are used in layout work to indicate color copy, as well as for color reproduction.

Dry Brush. The dry-brush technique requires the paint to be partially dry before it is painted on a coarse-textured illustration board.

Black water-color paint is the preferred medium. The dry-brush method is used for action drawings and can be reproduced in either line or halftone, depending upon the open technique necessary for line work. Often this technique is combined with crayon and is used for newspaper work.

Kodak Fluorescence Process. Both artist and platemaker are deeply concerned with the problem of faithful photomechanical reproduction of art-work illustration. Both like the fluorescence process for faster and less expensive prints. This process, which uses water-color pigments, assures the artist that his finished art will be perfectly suited for photomechanical reproduction. Fluorescent water-color sets contain

20 colors, comparable in pigment and vehicle to the best conventional colors. The pigment is finely ground, is easily spread on illustration board or paper, and appears to advantage in airbrush work. Fluorescent colors have two special qualities which are not available in other prepared water-color paints:

1. The pigment of each color is keyed directly in chroma and hue to the most superior color-process printing inks; and

2. Each pigment is imbued with an additive fluorescent material which, when combined with the proper amount of ultraviolet and white light, will provide automatic color correction in the platemaker's camera. This eliminates or greatly reduces the hours of hand color correction often required in four-color work, thereby facilitating the rapid and economical production of the four-color plates.

Fluorescent water colors are applied conventionally. However, during the preparation of the art work, occasional ultraviolet illumination provides a visual check on the amount of corrective fluorescence which has been applied. The platemaker's check for this work is the most accurate, as he puts the copy on his engraving camera easel (fitted with a Kodak copyboard hood to give the proper amount of illumination) and measures the corrective application.

The mixing of Kodak fluorescent water colors demands a technique different from that used for the conventional water-color painting. Since the corrective fluorescence is built into each pigment in direct proportion to the degree of color correction necessary for faithful reproduction of each individual color, the precise amount of additive fluorescence required to mix with colors demands intensive research. Blues, violets, and purples fluoresce in exact proportion to the required color correction; greens fluoresce most intensely under a controlled amount of white; ultraviolet light requires the greatest color correction. Because of these variations, the artist obtains intermediate hues by mixing only adjacent colors; otherwise mixing results in too much or too little combined fluorescence, which completely destroys the correction contribution. The nonfluorescing black and white supplied with each set of colors permits opaque washes and the darkening of opaque mixes and of colors. Mixing fluorescent black with water produces transparent gray.

Since most illustration boards are made of pulp, which has an inherent fluorescent quality, they are not advisable for use in this type of work.

Kromolite. Popular in newspaper plants for preparing and reproducing wash drawings, Kromolite is prepared by an artist in the usual manner, except that he paints with a solution called Hi-lite and lampblack in place of water. At the newspaper photoengraving plant the drawing is

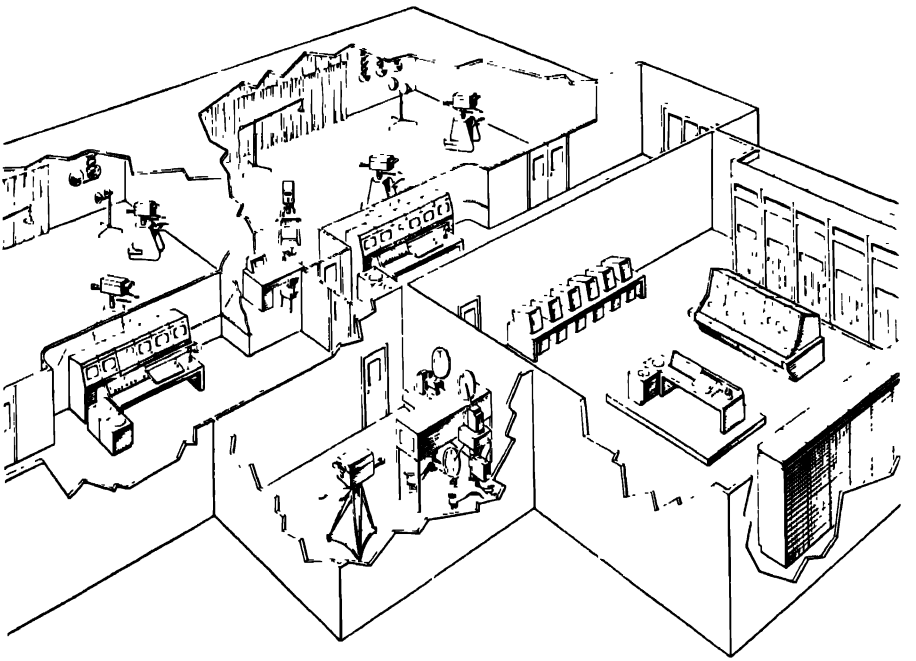


Fig. 1–2. Pen and Ink Drawing. (*Bruno Junker.*)

sprayed with Kromolite (in place of the gray wash) and becomes a greenish-yellow in color, retaining the blacks and highlights.

The engraver prepares his negatives by making two exposures: one through a special filter which neutralizes yellow and permits an overall screen, the second through another filter through which the camera sees yellow as black. Now the screen is protected, since the black will be white on the negative. Highlighted areas become black on the negative, completely obliterating the dots of the screen, and resulting in an automatic silhouette and dropout.

In combination work, line mask is used to give a solid line effect on the desired portion of the plate. Even when screened, however, the line areas are much darker than the tones, making it possible to achieve the proper effect without a mask in many cases.

Litho Pencil. Soft, crayonlike effects are produced by litho pencil. Blended tones on smooth paper require reproduction by the halftone process. Drawings, made on roughly surfaced paper, have a stippled or pebbled effect, and should be reproduced by a line plate for most faithful results.

Oil Paintings. This truly fine art is employed in advertising where a display of realism, combined with individuality of technique, is desired. It may be reproduced in either black and white or color.

The artist skilled in oil painting can create photographic realism in color, and develop a technique that will carry its own special brand of selling punch in the illustration of an advertisement. Since this medium is composed of tonal gradations, it must be reproduced in halftone. (See Appendix I, H-1.)

Pastels. The use of pastels (colored chalk) is another specialized form of art. The chalk is applied to a board surface containing a tooth that supplies the feeling of soft texture and delicacy peculiar to pastel drawings.

Great care and consideration must be shown in handling pastels. Even a fixative spray will not prevent the drawing from becoming smudged if it is mishandled.

Pastels are versatile and can be reproduced by letterpress, rotogravure, or offset. Since the copy is in tone, a screen is necessary. Pastel drawings are frequently used in magazine editorial and advertising illustrations.

Pen-and-ink. Pen-and-ink, or line drawings, can be reproduced in any of the three major processes: letterpress, gravure, or offset. This type of drawing is usually made oversize in the original to eliminate the danger of uneven, inaccurate lines in the reproduction. (See Fig. 1–2.)

In pen-and-ink, as in all other mediums, there is a variety of techniques. The type of line drawing selected depends on the stock on which it will be printed.

A good smooth paper will reproduce fine lines, close together, with a sharp distinctive clarity. When coarse and absorbent stock, such as newsprint, is to be used, it is wise to draw broad lines and to leave plenty of white space.

Pencil. Work with hard pencil on smooth paper yields clear, sharp lines adaptable to reproduction by line engraving. If lines are fine or close together, copper line cut should be ordered. Soft pencil work, often blended and smudged, has a range of gray tones and is reproduced by halftone.

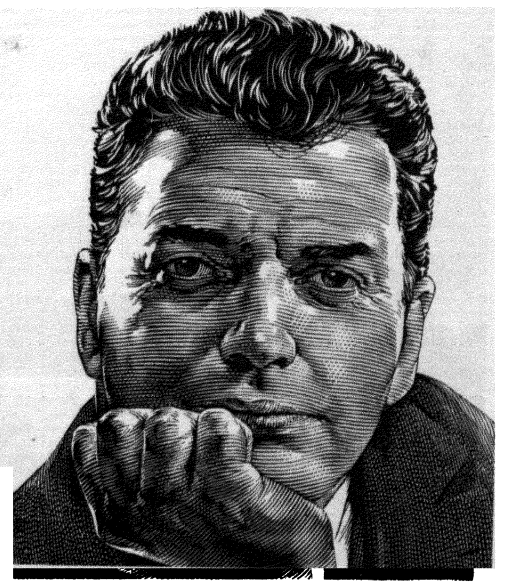


Fig. 1–3. Scratchboard Drawing. (*Courtesy of Schenley Industries, Inc.*)

Photography. Data on black-and-white and color photographic transparencies and prints appear on pages 17–20.

Scratchboard. This medium can be used to produce striking and effective illustrations, yet reproduces as inexpensively as a line plate.

The scratchboard drawing offers sharp contrasts between black and white, with no middle tones. Black usually predominates in the finished work. Specially skilled artists can obtain excellent results, although the reproduction of intricate detail and fine lines depends largely on the type of stock which will be used in printing.

The artist who works with scratchboard uses a special drawing paper coated with a chalky substance. Black India ink is applied over the paper surface and the illustration is cut by the artist with a sharp scratch knife. This removes the black coating from the paper and leaves a clear white line (Fig. 1–3).

Tempera. Tempera is a paint which employs a colloidal medium, such as the white of an egg, as a vehicle in place of oil. The finished art work, in black and white or in color, consists of a wide range of blended tones. Being continuous tone copy, as is a photograph, wash drawing, or oil painting, for example, it is reproduced best by means of a halftone for letterpress, gravure, or offset reproduction. (See Fig. 1–4.)

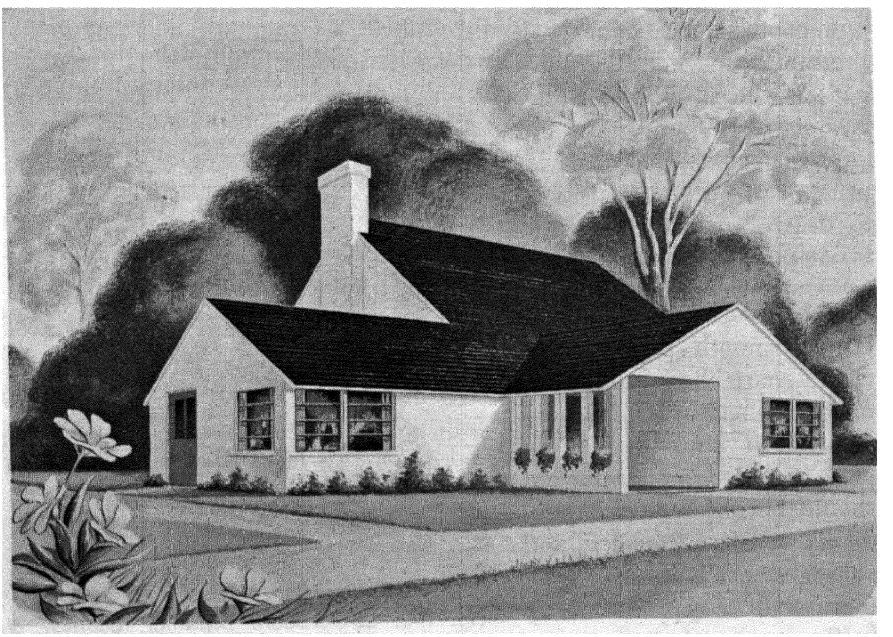


Fig. 1–4. Halftone from Tempera. (*Bruno Junker.*)

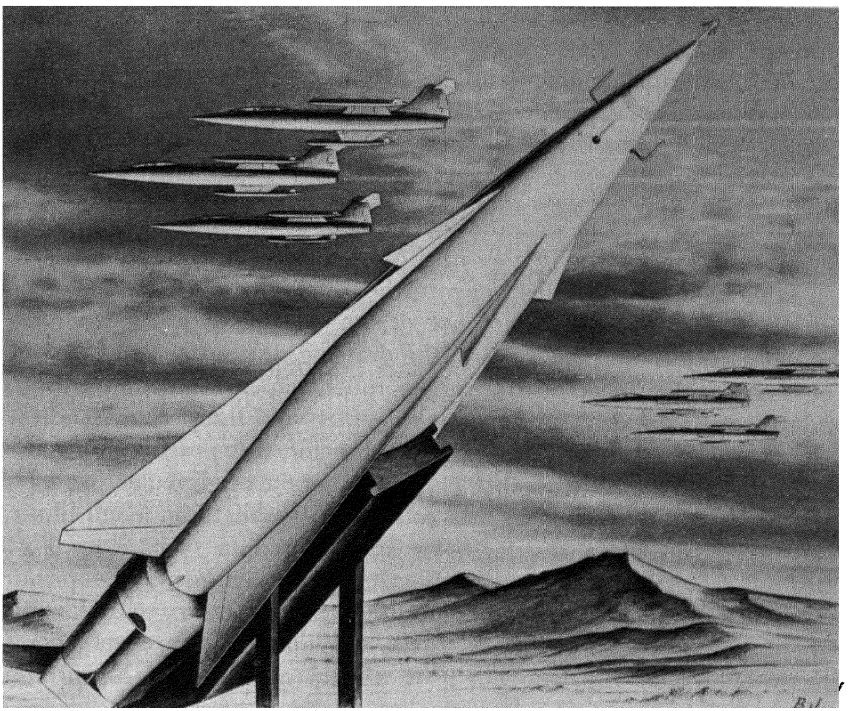


Fig. 1–5. Halftone from a Wash Drawing. (*Bruno Junker.*)

Wash Drawing. When the use of photographs is impracticable or will not produce the desired results, the artist resorts to wash drawings, which afford him complete freedom to emphasize important portions of a picture and to subdue the less important. (See Fig. 1–5.)

With wash, the artist can illustrate actual objects or sketch visuals of machinery, buildings, and merchandise in the creative stage. These drawings may be made in a wide variety of tones and in letterpress work are best reproduced by halftone on a smooth-surface paper.

Water Color. Water-color drawings can be reproduced either in black and white or in full color. In black and white, a line engraving will not reproduce full-tone values, so that it is necessary to use a highlight (p. 39) or regular fine-screen copper halftone on smooth paper, or a coarse halftone on newsprint. Tonal values of the original art are preserved by a color filter. It is advisable to make color-corrected Velox prints (p. 23) and retouch, to restore tones, before the plate is made. For color reproduction of water-color drawings, two, three, or four color-process plates can be made, according to the nature of the copy and the desired fineness of the work. Again, a line negative alone will not re-

produce the tones, but it can be combined with a halftone in any color type or decoration reproduction. For special effects in conjunction with the color plates, tints and Ben Day may be used. Fine-line register of lettering in more than one color should be religiously avoided if the printing schedule calls for high-speed presses.

Woodcuts. Woodcuts are made by an artist who draws directly on a specially prepared soft, smooth, polished wood. Any small blocks are securely glued together.

With a series of sharp instruments, the artist cuts out those sections of the wood upon which he has not drawn. When all areas have been cut out except those blackened in the drawing, the surface of the woodcut is thoroughly inked with a rubber roller, paper is placed on the cut and smoothed out to insure even ink contact, and the print is made. By cutting a separate block of wood for each color, it is possible to produce colored woodcut prints. Each block represents a single color, with only the portions to be printed in that color raised by cutting. Each block is then inked with its particular color and printed in turn. Special care must be taken to assure perfect register and alignment. For printing in publications or in promotional literature, it is necessary to make either a photoengraving from a proof of the woodcut or a wax-mold copper electrotype of it. The woodcut itself should not be used for printing.

SHADING MEDIA

Artists' Shading Sheets. Halftone and Ben Day patterns in black, white, and red on a transparent overlay film are used by placing a sheet over the copy and removing the pattern from inapplicable areas with a paper stump, or a wooden or plastic stylus. These sheets are chiefly used to achieve unique results with original art work in contact printing and silk screen printing. More than 200 patterns in positive and negative are available for use.

Bourges. There are several methods of applying shading films. These methods are known as Artists' Shading Sheets (above), Bourges, Craftint, Contak, Zip-A-Tone, and each employs a screen pattern printed on a thin, transparent film. When a flat tint or screen is desired for a line drawing, the pattern is applied to the drawing by gluing the film to the art work. The unwanted screen is removed by a stylus or cut away with a sharp frisket knife.

These thin transparent sheets of film can be obtained in many sizes of screen dots and patterns which resemble Ben Day. Some patterns are printed with a white dot on the film and are used as an overlay on black areas in order to provide a reverse effect.

The film shading sheets are also used for flat color reproduction, where they are applied to the art work as an overlay and the unwanted dots are removed with a stylus. The film overlay and the art work contain register marks to ensure good reproduction and printing.

Care and caution are essential when drawings are made for reduction with the application of the shading film. It is a common practice to make drawings of the same size as the reproduction to insure the best results.

This method is used extensively with art work for lithography, and graphic and letterpress printing. The cost to the client is less, because, while the client pays for a Ben Day plate according to the scale, he is not charged for the engraver's time in applying Ben Day.

Colotone. Bourges Colotone sheets are transparent and possess a removable colored surface. They were originally an art medium. Photographers, however, noticing their resemblance to color filters, experimented and found them highly satisfactory for restoring color balance to transparencies.

Colotone sheets are available in 61 colors, all suitable for color-correction work on transparencies, thus simplifying selection of the exact color necessary. By adding the complement of the overpredominating color in the transparency, proper color balance can be restored.

Briefly, the process works as follows:

Different test sheets are placed over the transparency until the desired effect is seen. The selected flap is taped to one side of the transparency; work on the reverse side of the transparency is done on a viewer (or light table). Where the colored surface is not wanted, the area is outlined with a plastic stylus and the color removed by wiping the area clean with cotton dampened in liquid Coloremover. To make sure that no spots have been missed, a sheet of white paper is inserted between the print and the Colotone sheet. The transparency, with the Colotone sheet still attached, is mounted between glass or placed in a sleeve, and is then ready to show to the client for approval. No detail has been lost, no plates made, no corrections are visible. Reproduction can then be made through the Colotone flap.

Craftint. Results similar to those achieved by the Ben Day or the shading-film method are obtained with Craftint board. Craftint is a drawing board made with a hidden screen that can be made visible by means of a special developer supplied by the manufacturers.

The drawing or art copy is made in the usual fashion on the Craftint board. The areas selected by the artist to contain a pattern are brushed with developer; this brings out the true pattern. Some Craftint boards

are made for two-toned or two-pattern designs, but the application of a single-tone developer brings out only one design. A double-tone developer is applied to the drawing board when two tones are desired.

The Craftint method reproduces satisfactorily for the three major printing processes with results equal to those obtained by the use of the other shading methods.

Seventeen Doubletone patterns are available, each with dark-tone and light-tone hidden pattern. Light tone is a diagonal line pattern, dark tone a crosshatch.

Multicolor. Transparent shading films and boards are called multicolor. Key outline photoengraving made from original drawing is printed on three separate films with nonphotographic blue ink. This serves as guideline to the artist who develops pattern, where wanted, in each board by brushing on a developer. Pattern in each sheet is properly angled to represent yellow, red, and blue plates.

Ross Drawing Board. A Ross drawing board is a scratchboard, the surface of which is embossed with a stipple, diamond line, or other pattern. It is made of heavy cardboard, with layer upon layer of pigment that produces the scratching quality, and is available in 90 standard patterns. Various effects can be obtained in one drawing by cutting the sheets and putting several patterns together.

Rossco Stip. This is a drawing paper with a raised stipple surface that only needs to be drawn upon. It is not a scratchboard. Ink, pencil, crayon, or wash drawing can be made as on any other drawing surface. The stippled surface automatically produces a halftone pattern. However, it is reproduced as a line cut.

Solotone. It has always been difficult and time consuming to create phantom effects in printing. White Solotone, a new kind of plastic sheet made specifically for this purpose, has speeded and simplified the process.

Five different values of a dry, white deposit (somewhat like standardized flat airbrush tones) coat the sheet, making a surface easily removable with a stylus or, for large areas, with a liquid.

Producing a phantom (p. 32) effect with white Solotone requires the following steps:

1. An original photograph (not retouched) is essential.
2. The necessary opacity value is selected by testing the different values of white Solotone sheets from a test set designed for this purpose. (The test set contains 3 × 5-inch samples of all the different colors and values of these type sheets, which are also available in colors.)

3. The white Solotone sheet selected is attached to the photograph with Scotch tape.

4. With a stylus, the white-coated surface is removed, leaving the phantom on a separate flap.

With Bourges Solotone grays, flat and absolutely uniform gray values can now be obtained over a photograph or drawing without any of the extreme difficulties hitherto faced by artists and photographers. To make their application still easier, the grays are manufactured in standardized steps: 10, 30, 50, 70, and 100 percent. Working on the same principle as the white Solotone for phantom effects, Bourges Solotone eliminates the necessity of airbrushing, with the consequent mixing and matching of colors and the frisketing or masking on photo or drawing.

Because they are primarily overlays, Colotone sheets leave art work and photographs in their original condition and at the same time protect them from damage due to handling. This encourages the use of bold, dramatic effects which would not otherwise be attempted.

To produce a gray background effect of any desired value, for any sized reproduction, the Solotone process requires only a few minutes and does not touch the original copy. It has always been difficult to judge proper background value, or to know how far the tone is to extend, because the drawing is often needed a second time and because airbrush backgrounds are usually tricky, regardless of the technician's knowledge of frisketing. With Solotone, however, different values of gray Solotone sheets are laid over the original copy and tested for the best effect. Once the proper sheet is decided upon, it is attached to one side of the illustration and rubbed over the highlights. Very soft edge effects can be obtained by using a soft eraser or negative paste abrasive for removing the gray surface. For darker accents, black modeling pencil is substituted.

If the same art is wanted at a future date in another layout requiring different effects, the Solotone overlay may easily be removed and the art restored to its original condition. New sheets may then be applied for other background requirements: for increase, contrast, or phantom effects.

Excellent for solving numerous retouching problems, Solotone sheets are not cure-alls. Many kinds of work still should be done by hand or airbrush to obtain the best results.

PHOTOGRAPHY

The Photograph. A photograph is any subject in art copy reproduced by a camera—usually a realistic representation whether still life, portrait, or scenic. Photographs require halftone reproduction in any of the three major printing processes.

The photographer's understanding of composition and lighting can make the difference between dull, uninteresting and uninspiring photos and the creation of an illustration comparable to the paintings of the great masters. In advertising art, a well-arranged and well-executed photo can glorify and beautify a product so that its sales appeal is compelling. Here, many photographers have achieved the stature and accolade of the truly creative artist.

Planning and Production of the Photo. Since the finished plate picks up any pencil marks on the face or the back of a photo, all necessary markings should be done on the margins or on a separate piece of paper tipped on the back of the photo. If no means can be found for indicating important instructions other than on the face of the photo, a tissue overlay should be secured to the back of the photo and flapped over the front, covering the picture completely Writing on the overlay should be with a soft pencil only, pressed lightly to prevent indentation on the gelatin. If this technique is used, the photo may be used again any number of times with no ill effects.

The use of paper clips on photos brings unfortunate results. The clip indents and marks the photo, the mark becoming visible on the plate. When pictures must be rolled, the film should face outside. Rolling tends to crack the surface. If this happens when the picture is rolled properly, the crack will come together when unrolled and will be barely visible on the plate.

Retouching is an essential part of the photographic art Retouching can eliminate unwanted elements of the picture or de-emphasize undesirable features. Backgrounds may be dropped out and prominent features may be softened. Specific areas may be shaded, lightened, or darkened, enlarged, reduced, or cropped in accordance with the desired results. Through retouching, old or damaged prints may be freshened and reused.

Since reduction in size minimizes the flaws in a picture, photographic prints should be prepared larger in size than the desired finished size. When equipment is limited, small negatives should be stepped up to achieve faithful reproduction in the required size.

The paper on which the art work or photograph will run should be carefully considered. Particularly where soft or cheap stock is to be used, tone contrast should be planned thoughtfully to avoid too much printing make-ready and to obtain the best possible results. Fine tonal gradations, vignettes, fine line pen-and-inks, and different shades of black and gray overexposed for contrast are most suitable for commercial work where an excellent grade of paper and comparatively short runs are the rule. However, these techniques should be avoided when

preparing photos for use in newspapers where the coarse screen tends to fill up and harden the edges of this highly detailed work. Originals or electros always produce the best results. Since there usually are many steps involved in making the final reproduction, photos with slightly exaggerated contrast values are preferred, as they can atone for diminution in value due to pattern, electro, stereo, and fast press runs.

When the photographer is informed about where and how the picture will finally appear—printing paper, screen, inks, etc.—he may use this knowledge to obtain the best possible results. The use of any one of a variety of different photographic papers may achieve a unique effect, depending upon the desired results. Also, consultations between the photographer and the engraver are most helpful so that all facilities may be put to maximal use.

Exact plates are required for color work. Here, perfection depends upon the original copy. In the United States, the only color films widely available are Ansco Color, Ektachrome, and Kodachrome. These films permit good-sized enlargements because they are screenless.

The combination of different photographic elements into one large picture is a medium of expression known as the photomontage. Showing varied production aspects or situations simultaneously is one of the major advantages of this technique. Symbolism, too, may be achieved with the photomontage. Additional unique effects are possible by the combination of a montage with nonphotographic design elements such as type, lettering, airbrush, drawing, and color.

Where it is desirable to increase one dimension of a photograph without changing another and for additional width or height without distortion of the subject, Photostats or the Streamlined or the Spectroflex processes may be used.

For three-dimensional effects, models in the actual materials of the original can be used, such as plaster, wood, metal, hair felt, paper, cloth, clay, or soap.

Stock photos, of course, are far less expensive than special shots. Some of the major companies who specialize in the sale of these stock photos are: Associated Press, Black Star, Camera Guild, European Picture Service, Ewing Galloway, Eye Catchers, Inc., International News, Pix Publishing Company, Globe Photos, and Underwood and Underwood.

Photomurals are used for wall or ceiling decorations instead of handpainted murals. Each portion of the mural is prepared on a detachable section or mounted on muslin (which can be rolled). This method is used to insure the safe transportation of these large photomural panels over long distances.

There is virtually a limitless variety of special photographic effects. Here, the photographer's skill and knowledge of his medium play an

important role, both during the actual taking of the shots and in the darkroom. The highly skilled craft of the photoengraver, too, can enhance the quality and special effect of a picture. The photographer may shoot a picture from any number of different angles, at different exposures, and with varying lighting effects; the shot may be either a close-up or taken from a distance; it may be made with normal, telescopic, or wide-angle lens; and a variety of filters and differently sensitized film may be used. Using a multiplicity of darkroom techniques, the photographer can crop the negative, enlarge, reduce, or stretch in one or more dimensions; throw portions or the whole negative out of focus; fake in backgrounds or combine the original negative with others. Depending upon the availability of special camera equipment, screens, and other devices, numerous other effects may be achieved. The photoengraver, too, can alter the appearance of any ordinary photo. He can use shading films, special screens, Ben Day, or such finishing techniques as silhouetting, vignetting, blowing up dot patterns, making line borders on the plate, bleeding of the sheet, combining with line copy, and adding spot or over-all color plates. Obviously, for the creative craftsman, the original picture need serve only as a guide to the extraordinary and unique special effects available to him in endless varieties. Standard photographs may be varied, too, by the use of montages, photograms, photomacrographs, photomicrographs, and pictures of constructed sets in order to create interesting and unusual illustrations.

The Airbrush. The airbrush is a useful instrument to the artist, especially to the photo retoucher. This brush is so constructed that watercolor paint is sprayed through its tip when the operator presses a small button which releases the compressed air and color. Its main use is in photo retouching, where it gives either opaque tones or evenly graduated ones. The greatest advantage of the airbrush in reproduction is the absence of brush marks on the copy, so that a clean, sharp representation of the color, black, or gray shade is obtained by the retoucher.

The airbrush can also produce a spatter effect on either photographs or drawings. The artist can control the effect of a spatter or a fine hair line by adjusting the air pressure and the opening at the tip of the brush.

Ansco Color Film. This film makes possible the reproduction of full-color positive transparencies and their processing in the user's darkroom.

Basically, Ansco color film consists of three individual films, each sensitive to one of the three primary colors. As each emulsion is exposed in the camera, it retains only the light of that color to which it is sensitive. The combination of the sensitivities of the films makes it possible to register the entire range of the spectrum. When the three Ansco color films are ready for the camera, one behind the other, the top

layer is a noncolor sensitized emulsion sensitive only to blue. Next is a composition of minute particles of silver suspended in gelatin, called the yellow filter layer. This absorbs blue but transmits green and red. The third emulsion, sensitive to both blue and red, can record only the red, because the blue has already been absorbed by the second layer, the yellow filter.

Processing Ansco color film produces a color picture which is a combination of three dye images, each bearing the complementary color of its exposing light.

Carbros. Carbro, oldest of the paper printing processes, uses the tissue sheets called Carbon Tissue by the original manufacturer.

Available in the primary printing colors of magenta, blue-green, and yellow, the sheets are handled as in rotogravure printing. Since the three tissues are printed chemically by contact with a bromide print, they require a good deal of handling during their transfer to temporary supports and, finally, to paper supports in register with each other. Considerable time is needed for this process, and air conditioning of the laboratory is almost imperative. The actual cost of material is very high, and duplicate copies are as expensive as the originals. Carbros are good copy for the engraver and can be retouched.

Color Toning. Color toning is a hand-coloring process which produces an effective full-color photograph from a black-and-white photographic print. The print is bleached, to prevent any black from being picked up, and covered with a colored pigment. The bleached print is then painted with opaque water color. For reproduction by any process, the color tone is like any other colored illustration. (See Flexichrome p. 22.)

Direct Color Prints. On short-run jobs where four-color costs are prohibitive yet color is important, direct-color prints, which can be produced in quantity for rush jobs, are used.

With this process, it is possible to make color reproductions of original color scenes with fairly true color results.

Prints are processed in long rolls, continuously, by automatic electronic-controlled machines; perfect uniformity in density and color reproduction is guaranteed. Kodachrome Professional Prints and Ansco's Printon are used commercially for direct color prints.

Ektachrome. Where quick processing is wanted for various types of color work, many photographers substitute Ektachrome for Kodachrome, although the former does not replace Kodachrome. Without processing, Ektachrome costs half as much as Kodachrome with processing. Even when the cost of processing Ektachrome is included, it remains the less expensive of the two methods.

Commercial users can now purchase this new film in the same 12

sizes and different types offered by Kodachrome. All five chemical processing kits are also available.

There is one important difference between the reproduction of Ektachrome and that of any other transparency. To retain for reproduction the increased photographic qualities built into Ektachrome, a masking technique, especially developed for the purpose, must be used in making the separation negatives. This mask is actually a low-contrast negative or positive, bound to a normal or high-contrast (perfectly registered) negative or positive.

Variations in lighting intensities, in reasonable degrees, have no effect on the fidelity of the basic hues of the subject being photographed on Ektachrome. Soft graduation and brilliance are other outstanding features of the film. It covers a great range of lighting contrast, thereby improving highlight and shadow detail, while permitting a range about as large as that of black and white.

Flexichrome Process. The process of converting a special photographic print to a full color picture with the use of color dyes is known as the Eastman Kodak Flexichrome process. By printing the image on a special Kodak Flexichrome stripping film, prints are produced. The image is dyed black after the silver in the film image is bleached out. Emulsion carrying the dyed image is stripped from the film and transferred to a sheet of fixed-out photographic paper. The print is colored by applying dyes to the paper and the emulsion when they are dry. The color dyes replace the black dye originally applied to the film.

Kodachrome. Kodachrome differs from Ansco Color Film in that it is a single film coated with three emulsions, each sensitive to a primary color. In the processing, which is done by the manufacturer, the silver is removed after the emulsions are dried, leaving an image which is color dyed. By reversal, the image becomes a transparent positive print. This transparency is subtractive in color, with brighter, cleaner tints. Lack of a screen permits indefinite enlargements of Kodachromes. (See Appendix I, A and H.)

Kodak Dye Transfers. Successor to the Eastman Wash-Off Relief Process, the Kodak Dye Transfer Process involves the use of a simplified technique which results in better prints, rapidly produced. This new process eliminates the need of returning the negative to the manufacturer for printing. Color-separation negatives, made directly from the transparency or the subject, are printed in three colors on Kodak Matrix film by the user himself. After the negative has been exposed, each film is gelatin processed for a relief image. The density of the image determines the thickness of the gelatin. The matrices (relief films) are

then immersed in dyes; each matrix retains dye in proportion to the height of its relief image.

Sheets of Kodak Dye Transfer Paper then receive the dye from the gelatin side of the matrix and, with the help of the Kodak Dye Transfer Blanket, the image is mechanically obtained. A combination of the three dye images forms the final print on the paper.

Less than 90 minutes is required to obtain the first three-color print, exclusive of the drying time for negative and print. Other prints of the same superior quality may then be produced every 10 minutes.

Velox. A Velox is a screened, glossy photographic print, shot through an engraver's screen, of an original photograph or piece of art work. These prints are usually ordered when a subject requires considerable retouching, or when dropout, combination, or silhouette effects are sought at a relatively low cost. When retouched, the screened print is used as line copy by the engraver to lithographer. In newspaper work Velox prints must be reproduced without change in size, because any reduction or enlargement will result in an unpredictable screen.

The retoucher may paint undesirable dots out of the Velox to create highlight or dropout areas; he can achieve line effects by connecting dots; a really skilled retoucher can alter the size and shape of the dots and, in effect, retouch the original copy.

If photographic copy of poor reproduction quality has to be used, it is advisable to have it Veloxed and a line cut made from the Velox. This technique is a great saving over the conventional proceeding of retouching the photograph and making a halftone plate or, even more expensive, of making a combination highlight halftone.

In lithography, especially, it is often economical to paste up a Velox with the line work in position, and have the lithographer make only one line negative for the job. The result is a saving of time and expense and the one-shot art eliminates the possibility of incorrect positioning.

Velox prints are usually made at Velox houses from dry film or wet plate. With dry film, two negatives are made: one a screened halftone, the other an overexposed line with the white highlight and dropout as black as possible in the negative. The two negatives are superimposed in register, and a contact print is made. The heavy part of the line negative causes the corresponding parts in the print to be dropped out or appear as pure white, thereby automatically obtaining silhouette and dropout effects on the screened print. Further retouching by an artist will achieve the desired finished results.

In the wet-plate method, the two negatives are not surprinted for an automatic highlight effect. A normally exposed line negative and halftone are printed separately, the latter hand-silhouetted and opaqued,

with the line negative detail painted in by hand. The result is essentially the same as in the first method, except that the fine detail is under more personal control with the wet-plate system.

On a job where several cuts are necessary, a few Velox prints can be gang-mounted and one large line cut made. The engraver's finishing department will cut this apart into the individual units. For a saving on make-up, lock-up, foundry, and engraving costs, reproduction proofs of type and the Velox can be mounted in position so that the entire advertisement will be in one piece—a great timesaver in rush newspaper work where mats are required. Since the entire advertisement is a single unit, it can be made two- or more-up with bearers on, and go right to the foundry for mats without the waste of time or the expense necessary for making patterns.

PHOTOCOPYING

Photocopies. A photocopy is an exact reproduction on paper of any written, printed, typewritten, drawn, blueprinted, or photographed material. It can be the same size as the original or made larger or smaller, always being in proportion. Photocopies are often referred to as Photostats, a trade-marked name.

Available in negative or positive prints, photocopies, or Photostats, are similar to photography and therefore are accurate. The process is inexpensive and rapid, and prints that will not fade, tear easily, or rough up are produced faster than a stenographer can type the message.

In production, after photographing, the photocopy print is carried on an endless chain through bath, rollers, rinser, and fixing tank. Rectigraph prints emerge face up.

An average of three minutes is required to produce a photocopy print, which can be done in black, white, sepia, yellow, copper, blue, green, or roto-brown.

Erasureproof and waterproof photocopies are accepted in place of original material as legal evidence in the courts.

Photocopy Uses. Photocopies can be used for keeping records, making layouts, to visualize effects of enlarging or reducing of copy, and in some cases as art copy.

Prints made of line copy may be used for photoengraving or offset reproduction, and may be ordered in reverse position. Halftone photocopies, although excellent reproductions, are not generally used for making plates.

Photocopies have been found invaluable for making dummies. Where several copies of a dummy are required for approval by various people, instead of wasting the expensive time of an artist or using prohibitively expensive actual photographs, Photocopy prints from the photographs

are ordered in the necessary size. Typeset or typewritten copy is added and the dummy is complete. The entire page or pages (in the case of a booklet) may then be photocopied and other dummies assembled from the prints. In this way the original job can always be retained while copies are sent out, thus eliminating the danger of irreplaceable loss or damage in the mails.

Where a complete work drawing is required, as in offset work, photocopies prove a great time and money saver. They may be ordered from line work to fit any predetermined area and, when mounted on the working drawing, become a part of the finished copy. Stripping in negatives is no longer necessary.

When a job requires the converting of a photograph into a line drawing, it is necessary only to order a matte photocopy for bleaching. The artist can ink in the picture directly on the photocopy which, when ready, is returned to the plant with instructions to bleach out.

To accomplish this, a lye-and-water solution removes everything from the print except the artist's inked lines. Retouching, where necessary, prepares the print for reproduction.

A facsimile drawing for photoengraving or offset copy is made from a Van Dyke or silver-print (so called by photoengravers), or a matte photocopy (as it is known at photocopy plants), which is made and enlarged from a photograph. The subject is then inked directly on the print by an artist, and the lye-and-water bath is again employed to remove all but the inked portions. The result is a line drawing of an original photograph.

Making a Photocopy. An understanding of how a Photostat is made should enable the reader to use it to best advantage.

Photocopying or Photostating is always done where few copies are needed and good reproduction is desired. The process itself is similar to photography, with the celluloid negative eliminated. The original is photographed directly on a sheet of sensitized photostat paper, which is then passed through developing fluid and hypo to produce a negative print on photostat paper. For a positive, another shot is taken, this time of the negative.

The Photostat camera is much larger than that ordinarily used in photography, with larger lenses and bellows. The developing equipment is an integral part of the Photostat camera, as is the paper (corresponding to the film of an ordinary camera) which fits into the back, in a roll. Steps of the mechanical process which produces a positive stat from an original are as follows:

1. The original copy is placed on a horizontal stand underneath the camera's lenses.

2. Over this is placed a piece of glass to keep the subject flat and firmly in position.

3. The lights are turned on and adjusted according to the requirements of the subject being Photostated.

4. By lowering and raising the horizontal stand with an attachment on the camera which expands and contracts the bellows, the camera is focused to size.

5. The picture is snapped with a 10- to 15-second range, depending on the desired result.

6. The sensitized exposed paper is then rolled through the developer, washed in a hypo solution, and cleaned in fresh water.

7. The print is machine-dried to speed up the process, and the result is a negative of the desired size (either in proportion to or the same size as the original). The drying process prevents the danger of smearing the print and requires only about 15 minutes.

8. To obtain a positive, the entire routine is repeated with the negative substituted for the original.

The modern advertising production man has found the stat almost indispensable in his work. It enables him to visualize an advertisement in its entirety within a very short time, and provides him with an exact proof for the typographer and photoengraver. Photostats are fast, inexpensive, extremely accurate, versatile, and maneuverable.

Compared to the 6 hours required to make a photograph of the same subject, the 15 minutes required to produce a positive stat are negligible. The cost averages about 40 cents per print for an $8\frac{1}{2} \times 11$-inch size, slightly higher for larger sizes. To reduce expenses even more, many small reproductions can be made on one sheet, which is then cut apart. Photostating is an exact reproduction method and, like the camera, it does not lie. It produces exact duplicates of an original, but only in black and white. Several kinds of prints can be made on the Photostat camera; the type selected depends on the ultimate use of the print. The glossy print, made on a bromide photographic paper, provides high contrast and is excellent for sharp copies of line work and coarse-screen halftone reproductions.

The regular Photostatic print, shot on an easily folded, orthochromatic matte paper, is suitable for facsimile copies, duplicating dummies, proportionate reduction or enlargement, and as a substitute for silver prints in direct-from-object shooting.

Semimatte prints, on a semimatte finish bromide (like the paper used in photographic enlargements), are selected for the reproduction of photographs, drawings, sketches, and any other material containing more values than mere black and white; they can be used for salesmen's portfolios and for small halftone prints.

There are also a number of special stats, which can produce shadow effects, color tones, perspective, reverses, screens, photomontage effects, disproportionate reductions, and surprinting. The production man becomes familiar with these according to his needs and with the help of his photostater.

SCALING COPY

PROPORTIONING AND SCALING

There are many ways to determine the proportional reduction or enlargement of art copy. The choice made by production men or layout men varies among the slide-rule method, camera lucida (lucie), cellophane overlay scales, mathematical calculation, diagonal line method, and photocopies. Whatever the selection or preference may be, they are all equally accurate.

1. Diagonal-line Method. One of the simplest methods is to consider the art copy as a rectangle by projecting vertical and horizontal lines from the extreme points on each side, top and bottom. A diagonal line is drawn from the lower left-hand corner to the upper right-hand corner of the rectangle and can be projected as far as necessary. At any point on the diagonal line is the proportional reduction or enlargement or the upper right-hand corner of the rectangle of the new size. If the depth is known, and the width is to be determined, the known depth is located on the left edge and a line is drawn across horizontally and parallel to the bottom line. From the left-hand edge to the point where the parallel line crosses the diagonal line is the exact proportional width on reduction, or enlargement, thereby determining the unknown size. (See Fig. 1–6.)

2. Camera Lucida. This is a simple device consisting of a lens and a copy board. To rescale a piece of copy, it is merely tacked on the vertical copy board. The lens can be lowered, or raised, and adjusted until the copy is projected to the desired size on the sheet of paper on the table top. The projected image is then traced, giving an accurate reduction or enlargement of the art copy. This method is a reliable guide for sizing and cropping art work before it is sent to the platemaker.

3. Mathematical Calculation. Mathematical calculation is based on algebra. Known sizes are arranged in an algebraic equation with the unknown size as x. With the correct figuring, x is determined, giving the unknown size.

For example: A piece of art work, 12 × 18 inches, is to fit a space 6 inches wide. How high will it be when reduced? Formula is 12:18::x:6.

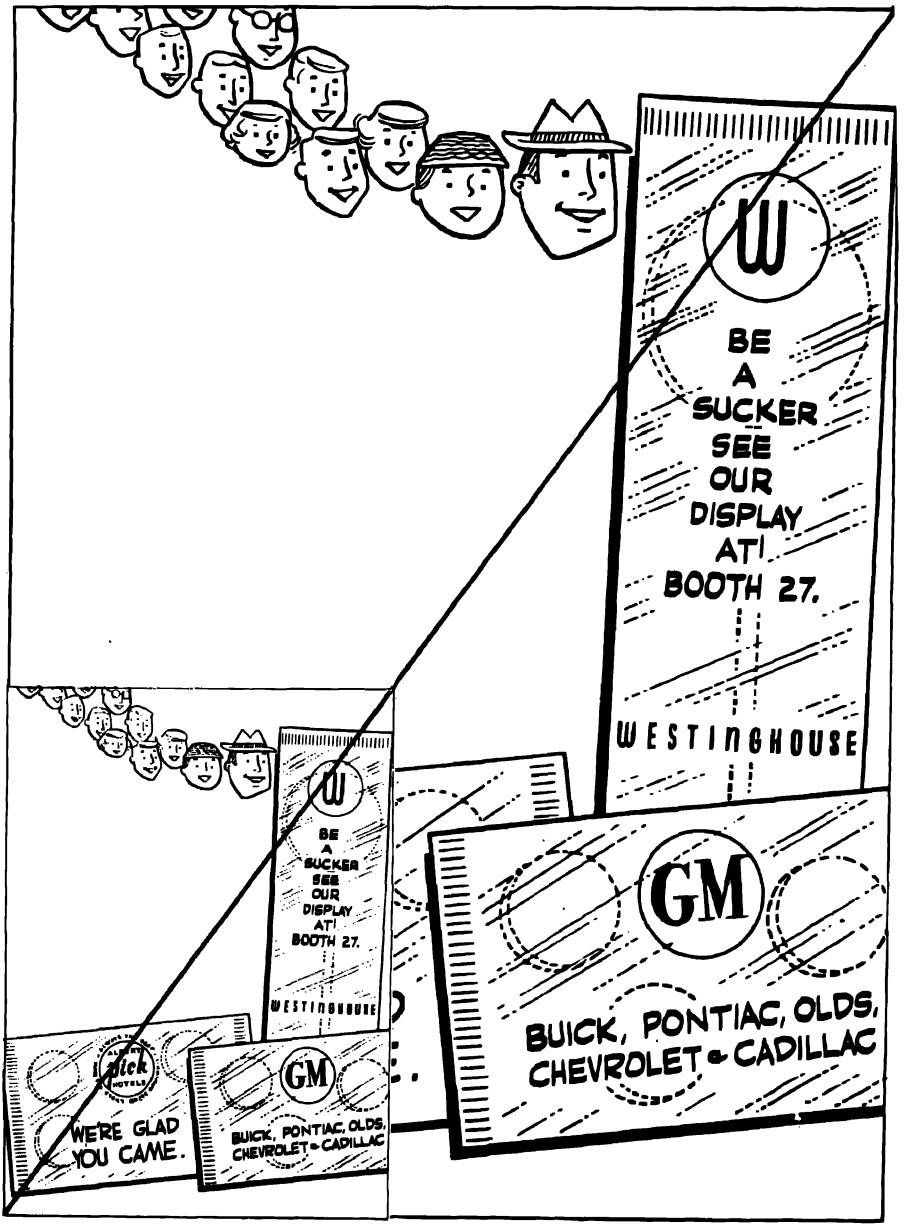


Fig. 1–6. Proportional Scaling by the Diagonal-line Method.

Solve by balancing the product of the means with the product of the extremes.

$$6 \times 12\ (72) = 18x$$
$$x = 72/18 = 4$$

The cut will be 4 inches high when reduced.

4. Photocopy Method. A check of all methods, the photocopy gives the true size and effect of the reduction, or enlargement, of the original copy. Photostats are most economical when this method is employed.

ART TERMS FREQUENTLY USED

The Book Jacket. Probably the most important function of the book jacket, other than as a covering, is to help sell the book. Therefore, its intrinsic design must be as attractive as any other poster type of art. Of course, the mandatories, such as the author's name and the title, must be incorporated into the basic design so that the entire book jacket attracts attention as a single cohesive point-of-sale display.

To achieve the result of virtually compelling a prospective customer to buy, careful consideration must be given to the layout of the book jacket. It naturally follows, then, that the application of the poster technique is most appropriate—i.e., simplicity of design, strong lettering, and blocks of bright color. Normally, each of these elements properly handled on a book jacket, or any other product package, will boost sales.

Borders. Judgment and good taste must determine whether to use an ornate border design or merely simple rules of type metal. Most advertisers today eschew the use of borders. However, a qualifying explanation is necessary. Where borders are used in large space ads, the goal usually is to furnish a conservative and formal layout. However, borders will be most often found in small space ads where they are used to separate the multiplicity of sales messages in the area to which these advertisements usually are relegated.

Calligraphy. The art of beautiful handwriting reached its zenith in the seventeenth century. The illiteracy of the majority of the populace at that time enabled professional scribes to develop individual writing styles. These professional writers created elaborate initial letters with highly decorative pen flourishes. Type and lettering styles now known as script are based upon the calligraphy of these early writers.

The Cartoon. Using either pen and ink or crayon as media, the artist fully displays his individuality and technique in the cartoon drawing. Most often humorous, cartoons may also be employed in a subtle manner to mitigate the seriousness of almost any subject matter.

The Cartouche. A decorative design serving as a frame for an inscription, advertising copy, or headline is known as a cartouche. It is usually ornate, and embellished with a floral design.

Crosshatch. A crosshatch is an art term indicating a series of parallel lines crossing each other at any angle.

Key Drawing. Copy which consists of guide lines only is called a key drawing.

Letterheads. In most business organizations, the "salesman" that calls most frequently on both customers and suppliers is the letterhead. No executive would hire or buy from a salesman whose manner and appearance is distasteful to him. But on the other hand, he seriously considers the salesman whose attitude, approach, and mien exude confidence, trust, loyalty, stability, reliability, and general attractiveness. All these words describe what an effective letterhead can convey.

The best letterheads reflect the true quality of a company. Therefore, the letterhead designer should refrain from using odd type arrangements, queer or unusual lettering, crude colors or freak designs. Any of these elements might say "circus" instead of "top-rate business" to the recipient of the letter. It is true that some people might appreciate this type of creation and, in some rare cases, it might even be appropriate. But certainly it is not worth alienating the vast majority by sending out the company's best salesman dressed as a clown.

It is essential to include certain basic information in a company letterhead—i. e., the name of the company, the address, and a word or line describing the type of business. Slogan, trade-mark, telephone number, cable address and/or a list of company officers are optional, and very often advisable.

The true measure of a letterhead's success is the degree of dignity with which it represents the company. Type or hand-lettering, balance, design, color harmony, and stock, all properly combined and executed with severe simplicity will achieve deserved dignity for the enlightened business organization.

Lettering. Letters, the symbols that combine into words, can convey specific meanings and emotions to the senses apart from the dictionary definitions of the words they form. In that sense, lettering is an art form. It is the dramatic expression of words. Certainly, the lettering selected should convey the mood of the words in the copy or headline. Furthermore, lettering should be an additional visual expression of the product and its advantages. Specific words or phrases may achieve dynamic stature when artfully emphasized and dramatized by the skilled lettering artist.

Hand-lettering is most often used to take advantage of extraordinary spacing opportunities. Unfortunately, with the abundance of type faces available today, much of the drama and art that may be derived from hand-lettering is often subordinated because of time and budget factors.

However, where unusual spacing and display are an integral part of the design, hand-lettering is preferred to type because the number of

styles and techniques is limited only by the inventive genius of the skilled letterer.

Logotype. A product, company, or magazine usually is identified by a unique signature called a logotype. In most cases the logotype is hand-lettered so that it has an individual character immediately recognizable as belonging to a specific organization.

Of course, some logotypes and name plates are set in type rather than hand-drawn. Although rarely used in this connotation today, the term "logotype" also refers to the metal on which two or more characters are cast.

It should be noted that "logotype" should be distinguished from "ligature," a term which refers to two or more letters united to form a single character.

Overlay. This is a transparent covering over a key drawing which indicates color separation or parts of an illustration that print in a different color from the key drawing. An overlay on art work, photographs, or type proofs is also used to indicate corrections or alterations.

Packaging. The designer should visualize a product package as a poster wrapped around the product. The entire marketing, advertising, and sales strategy might come to naught if the package does not demand the customer's attention at the point of sale. With the advent of self-service and its acceptance as a standard merchandising practice, the package must shout its own virtues loud enough to attract the shopper. Therefore, good package design must incorporate bold lettering and flashing colors, much in the same manner as the most forceful and dynamic posters.

For easy readability, instructions or explanations should be printed in a small sans-serif face on a white background. Such printing is best located at the sides of the package so as not to interfere with the poster quality of the attractive design.

In terms of design, labels too must get precisely the same poster treatment. Taking into account the variables, such as the nature of the art and copy and the size of the print order, either the letterpress or offset printing processes are selected for reproducing both the package and the label. Offset printing is most suited for those media where tonal art or photographic techniques are considered desirable.

Paste-down Lettering. Fototype is said to be the simplest and most economical method devised for setting type for photographic reproduction. It consists of a complete alphabet, printed in black ink on a special white card stock, made into individual pads of letters which are fastened into a refillable compact kit that will fit into an ordinary desk

drawer. The Fototype stick is seasoned hardwood with adjustable thumbscrews to facilitate letter spacing. It also has inch and pica scales.

To set copy in Fototype, the desired letters are picked from their respective pads and inserted into the special Fototype composing stick in about the same way that a compositor sets his type. Blanks are inserted between words. When the line in finished, a strip of transparent tape is laid across it and the entire line is lifted out of the stick as one unit. The words may be cut apart or left in one line, depending on the layout of the advertisement for which the copy is intended. Copy set by Fototype can be reproduced by any method, as it will not smudge in handling.

Curved headline, reverse type, and a large selection of type faces are all available in Fototype at a cost of one fifth of a cent per character. The use of Fototype reduces typesetting and lettering costs as much as 90 percent. For direct positive printing, Fototype is available in transparencies, which are sharply printed letters on thin acetate, spot-laminated to a cardboard backing. The letters are supplied in pad form, each letter die-cut to good alignment. When clear, Scotch tape is applied to a line of letters in the composing stick, the acetate letter leaves the backing, and becomes a part of the transparent tape, forming a transparent film. This technique is used chiefly for reverse-color plates, Ozalid process, silk-screen layout, blueprints, and paste-ups.

Another method of paste-down lettering is called Artype.

Phantom Illustration. Phantom illustration is a method of showing the details and mechanical construction of a complicated machine or other object. By means of drawing and a transparent envelope, the inner parts, and their relations and functions, can be seen and correctly located—the effect of a machine built of glass is created.

Photocomposition. Photolettering is a comparatively new and extremely practical process for headline copy, and is being used extensively to replace hand-lettering. Photocomposition can reproduce any type style or specially designed alphabet from a rough sketch, tracing, or photostat. Because of its flexibility, headlines can be designed to fit any perspective, curve, or angle without encountering the difficulties which beset the hand-lettering artist.

In addition to having available a wide choice of type styles, photoletterers can also perform such tricks with the copy as expanding or condensing lines, thickening or thinning letters, producing outline, shadow, and a wide variety of pattern effects in the letters. Many of the same techniques can be applied to line art or to photographs.

Reproportioning of the lettering or art work is a photomechanical process for increasing or decreasing one dimension, while retaining the other. This process is popular in advertising and printing for rescaling

art work to fit given areas as, for instance, packages. The original copy submitted for the camera treatment is the regular type of line, picture, drawing, or writing. Generally it is not necessary to submit more than a rough tissue tracing for photolettering, with an indication of size, style, and position of the desired effect. With a photomechanical process, the various effects mentioned above can be achieved as desired. Color copy may be photographed and transposed into any desired shade of gray, or dropped out entirely. The cost of the photographic lettering ranges somewhere between that of hand-lettering and hand composition. The average job takes only a few hours, and a glossy positive or negative, as required, is submitted as the finished product.

The original master alphabets for photoletters are designed and executed by hand. They are then photographed and stocked for future reproduction in any one of an endless variety of shapes, weights, and sizes into which they can be manipulated with the camera. For camera treatment of designs, drawings, illustrations, etc., the original must be supplied by the client.

Prisms are employed to transfer the image of the character from the master plate to the layout, in front of the operator. Various appliances on the cameras permit adjustments in the weight, slant, and proportion of the character. After all the letters have been exposed and fitted to the layout, the paper is removed, developed, and mounted.

Photocomposition is merely a combination of layout and camera work. Because only one letter is handled at a time, the operator works with wide latitude in size, style, weight, area, and good spacing results.

Spread. (1) In newspaper parlance, a lead story and all its subsidiary stories constitute a spread; also it may be a story that requires a "top head"—that is, one that goes at the top of a column; and sometimes the term "spread" is used to designate the head itself. (2) In a publication, two pages which face each other constitute a spread; if formed in the signature's middle, it is designated as a "center spread."

2

PHOTOENGRAVING

Photoengraving is a photomechanical process for making plates for letterpress printing. The method of manufacture for both line or halftone plates is similar. The photoengraver's skill—learned in a long and carefully tutored apprenticeship—plus his judgment and experience play an important role in creating fine quality line and halftone engravings. For the best possible results it is imperative that copy for the engraver be carefully prepared. Caution prior to submitting copy to the engraver for the mechanical operations is another guarantee of fast economical work of the finest quality.

Photoengravings fall into two categories: line and halftone, each having several subdivisions. The type of original copy and the manner in which it is prepared determine the selection of the kind of line or halftone engraving to be used.

Any subject which is to be reproduced—i.e., photograph, drawing, painting, type proof, etc.—is commonly referred to as copy. The plates or reproductions—the finished product of the photoengraver's art—are known by such various terms as cuts, etchings, engravings, zincs, or coppers.

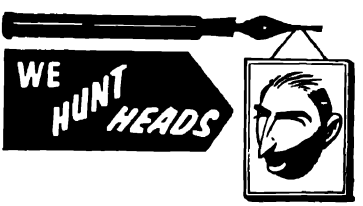


Fig. 2–1. A Line Cut.

THE LINE ENGRAVING

Copy and Preparation. A line plate is a reproduction from copy made up entirely of solid blacks and white and containing no tonal values such as are present in photographs. The copy must be clean, with all lines sharp and solid in black or white. Gray effects can be secured by fine lines or dots properly spaced (see Fig. 2–1).

Copy supplied to the engraver in colors such as red or yellow will

reproduce with fairly good results. However, copy or line drawn in light blue will not reproduce because blue does not photograph unless additional work is done, which adds to the expense of the engraving. To ensure the best results, it is advisable to make the drawing for reproduction on pure white paper. Drawings done in black on a colored paper can be reproduced through the use of color filters. Such reproduction also requires extra work and material, which increases the cost.

Pen-and-ink drawings, newspaper clippings, type proofs, typewritten copy, charcoal or crayon drawings, and lettering are accepted copy for reproduction in line engraving. (See Appendix I, B.)

A line engraving is usually etched on zinc for short-run printing. When the run is over 50,000 copies or when duplicate plates are required, copper is sometimes specified. Copper, a more durable metal than zinc, reproduces line copy with greater sharpness and permits cleaner and sharper duplicate electros. Copper is used for line Ben Day copy when the screen is fine, and for reproducing fine line drawings, such as scratchboard. Copper can be re-etched; therefore any line work that becomes too heavy in reproduction can be thinned down to match the original by re-etching. This is not possible with zinc. For the best results in printing, large-size plates with a uniform Ben Day tint, regardless of screen, should be etched on copper. Unfortunately, the cost of line engravings on copper is approximately 100 percent higher than the cost of zinc plates.

Line Color Plate. Line color plates may be printed in any number of colors. However, when the desired result requires more than five colors, it is more practical to rely on the use of other color processes, such as the three- or four-color process. Line color plates provide a comparatively inexpensive method of printing in color with a most effective result. (See Appendix I, E, for two-color line plates.)

Art copy for color line work is prepared in black and white with a color-overlay tissue, which indicates the color area and color scheme for the manufacture of the plates. Many effective color printing jobs can be produced by color overprinting. With an understanding of color printing —its advantages and limitations—and a knowledge of platemaking, the artist making the drawing can provide unique and effective illustrations for advertising.

Color platemaking also includes the use of halftone plates or combination plates. The process of manufacture and the preparation of the art copy do not differ from the routine followed for black and white.

BEN DAY

Ben Day is a method of laying a screen in the form of dots, lines, or other textures on a line plate to obtain various tones and shadings of

color. It is a mechanical process of great value in producing interesting and effective tones, tints, shades, and textures, for printing plates in letterpress printing. The name "Ben Day" is derived from its inventor, Benjamin Day. From the time of its conception, about a half century ago, it has assisted the production man in saving time and money. It also serves the advertiser by improving the quality and sales effectiveness of the final job.

Ben Day sets no limitations on the ingenuity and individuality of the artist in his preparation of the original drawing. Any subject lends itself to the Ben Day treatment, which in turns helps to create more attractive illustrations. There are about 200 Ben Day patterns which, when combined, afford an endless variety of tints and patterns. (See Fig. 2–2.)

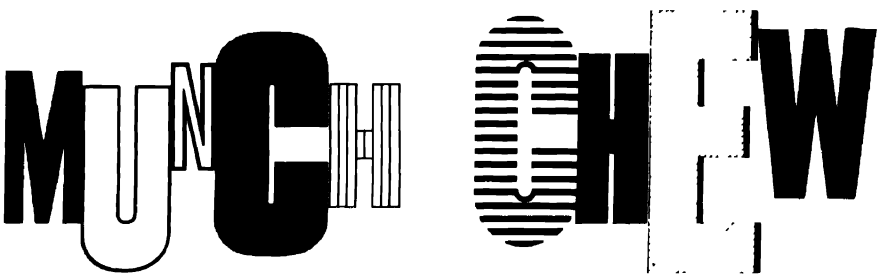


Fig. 2–2. An Example of Ben Day. (*Courtesy of Barton's Candy Corp.*)

The artist's problem in preparing art work for Ben Day tints in one color is comparatively easy. No tones or gradations appear in the working drawing, which is simply handled in black and white. The strength or depth of the tones is shown by the application of a blue wash which indicates where the Ben Day tone is to appear. Where more than one tone or different gradations of tone are desired, the relative depth of the different tones is shown by the intensity of the blue wash. This blue color which is used on the finished drawing does not photograph, but serves merely as a guide to the Ben Day operator when he applies the tonal values on the zinc or copper plate before it is etched. The engraver is also guided by instructions, usually placed on the margins of the drawing, indicating the Ben Day pattern number to be applied. The artist or production man considers the paper on which the plate will be printed and, with the aid of the engraver, determines the exact screen that will provide quality reproduction.

Used extensively in advertising, the Ben Day technique adds the needed extra touch which goes far in creating sales.

The relative cost of Ben Day plates is about 20 percent more than a straight line plate of equal size. However, there is an extra charge for the time required by the engraver for laying the Ben Day pattern, plus any stripping, extra negatives, and other possible handwork.

THE HALFTONE ENGRAVING

Copy and Preparation. A halftone plate is a photoengraving in screen. The plate is made from a negative prepared from suitable copy photographed through a specified halftone screen. There are various types of halftone plates, such as a square halftone, silhouette halftone, oval halftone, circle halftone, highlight halftone, vignette halftone, and combination line and halftone plates. Each type of halftone is made from copy suitable for the result desired.

Regardless of the type of plate, all copy for halftone reproduction must be prepared properly for the camera and marked correctly for size and screen. Copy for halftone work includes photographs, wash drawings, or any art copy that contains one or more tonal values. A sharply detailed glossy print, which contains a full range of intermediate tones as well as black and white, is the best copy for halftone reproduction.

The paper to be used in printing governs the choice of screen and type of photograph, as well as the methods used and the amount of retouching required. For newspaper work, where coarse paper of an inferior grade is used, the screen ranges from 50 to 65. Screens from 85 to 100 are used for halftone paper, which is slightly better in grade than newsprint but soft and thin, and whose lack of body offers more absorbency. The only difference between halftone paper and newsprint is that the surface of halftone paper has a fairly smooth finish. Halftone paper is frequently used in trade publications. The better the grade of paper, the finer the screen. On such papers as calendered, supercalendered, coated, or enamel finish, 110 to 175 screen is used.

Halftones are made on zinc or copper according to the fineness of the screen. Halftone plates ranging from 50 to 100 screen can be etched on zinc, but the engraver cannot be responsible for the results, although he tries to make the best reproduction possible. No hand work or finishing can be done on zinc plates. Plates ranging from 110 to 175 screen are always etched on copper and the results are excellent. Copper etchings of halftones will accept handwork and finishing to improve the reproduction quality.

In newspaper reproduction, it is advisable to use copy with light backgrounds. Silhouette copy does not reproduce well in this type of printing.

The Halftone Screen. The function of the halftone screen in photoengraving is to convert continuous tones into printing surfaces in the form of dots. Through this medium and technique, the solid areas of the original copy are reproduced in a mosaic pattern accepted by the eye as a continuous tone.

The halftone screen is covered with mechanically ruled lines which cross the screen diagonally from corner to corner, and cross each other



Fig. 2–3. A Square Halftone. (*Courtesy of A. Goodman and Sons.*)



Fig. 2–4. A Silhouette Halftone. (*Courtesy of The Polaroid Corp.*)

at right angles. These rulings obviously affect reproduction and provide the range of screen. The finer the screen ruling, the more detail will result in the halftone reproduction. Screens range from 50 to 175 lines per linear inch, making from 2500 to 30,625 dots per square inch, and are numbered 50, 55, 60, 65, 85, 100, 110, 120, 133, 150, and 175 screen as specified for a particular job.



Fig. 2–5. The Highlight Halftone. (*Courtesy of Ohrbach's Department Store.*)

VARIOUS KINDS OF HALFTONES

1. The Square Halftone. The square halftone is the most economical and simplest type of halftone. Any halftone plate in which the sides are rectangular and parallel is referred to as a square halftone (Fig. 2–3). Without increase in cost, a black line border may be added to a square-finish halftone, which is then termed square finish with line.

2. A Silhouette Halftone. A halftone plate with all of the screen background cut or etched away is termed a silhouette halftone or an outline halftone (Fig. 2–4). The scale cost of a silhouette halftone is 50 percent more than a square halftone of equal size.

3. Oval and Circle Halftones. The term or meaning implied by oval or circle explains this type of halftone plate.

4. The Highlight Halftone. A highlight halftone is a plate made from a halftone negative wherein the highlight dots or whites of the copy have been so exposed and etched that they will not print on the metal (see Fig. 2–5). The highlight halftone is figured in cost as three times that of a square halftone.

5. Vignette Halftone. In this style of halftone, the edges gradually fade away and blend into pure white space. When the screen is fine, it is



Fig. 2–6. A Combination Line and Halftone Plate. (*Courtesy of Barton's Candy Corp.*)

advisable to specify and prepare for a vignette halftone. The photograph is usually prepared by the photo retoucher who airbrushes the edges with white paint to soften their hardness. For most effective reproduction, the paper, ink, and presswork should be of the highest grade. Cost of the vignette plate is figured at 50 percent more than a square halftone, exactly as is the silhouette plate.

6. Combination Plates. This type of plate is a combination of a line negative and a halftone negative etched on copper or zinc to make one printing plate. To manufacture a combination plate, the art copy is prepared from either a key original copy or a layout to show the position of the line and halftone insert. However, a combination plate can be made of several line and several halftone negatives which are stripped together to make a composite or combined unit (see Fig. 2–6).

Combination plates are valued at twice the scale figure of square halftones of equal size, plus a charge for line negatives and stripping for position. The cost of any hand work is figured on a time basis in units of 15 minutes, and is added to the plate charge to give a final total charge for a combination plate. The cost of a combination halftone with a highlight effect is figured exactly the same way as a combination plate, but the plate charge is valued at three times the scale figure instead of double.

Combination plates are more costly, though more effective in reproduction, than other techniques. There are no limitations as to the use of combination plates other than those that apply to straight line or halftone plates, relative to paper and the screen.

In addition to the types of plates mentioned above, there are several

other types of engravings belonging either in the line or halftone category. Their names are more or less self-explanatory.

7. The Duotone. The duotone plate is actually a two-color process plate. The copy or art is prepared with two colors and is the source for the name "duotone." This type of two-color process is similar to a three- or four-color process in that it reproduces shades of color in halftone screen form, involving the use of the primary colors of yellow, red, blue, and black in combinations of any two.

8. The Duograph. The duograph is another two-color technique. The original art copy is either a black-and-white photograph or a wash drawing, and is marked for a two-color effect by a color overlay. A duograph is less costly than a duotone. The second color is a flat tone and carries no detail.

9. Tint Blocks. A tint block is a solid or screen plate usually employed to print a background in a second color. It provides a richer appearance and adds to the impact of the illustration or type copy. If the background is solid and simple in design, the block is cut from a sheet of zinc, and is valued at 33⅓ percent of that of zinc, square halftone etchings.

10. Facsimile Reproduction. In photoengraving, facsimile is similar to a dropout. All whites are dropped out, all line work remains as is; black should be painted solid. The term facsimile, when applied to a halftone, simply means a reproduction, as nearly exact as possible without dropping out anything or painting blacks solid unless specified.

11. Three-color Process. Printing plates that reproduce a picture in its original color with the use of only three colors—usually yellow, red, and blue—are known as three-color process plates. Any color art is acceptable for this process. Photomechanical separations are made of the primary colors and etched halftone plates are made to reproduce each separate color.

The three-color process is used to economize in platemaking and press time. The results are not as good as those produced by the four-color process, but the reproduction is reasonably adequate. Publications usually prefer two-color or four-color plates and should be checked carefully as to their color requirements.

12. Four-color Process. The four-color process is similar to the three-color process but with an improvement in reproduction value. The use of the fourth color, black, enhances the reproduction and adds to the detail of the subject. Use of the four-color process is essential when the original copy contains a large variety of black and neutral tones, or brilliant blues and greens. The additional black plate, or key plate, provides many shades of gray, impossible to obtain when only the three

primary colors are used. The four-color process is the usual method of reproduction, and presses are geared for this arrangement so that they can take several sets of four-color plates in the same form. (See Appendix I, H-1 and H.)

Each color plate in the four-color process of red, yellow, blue, and black is made from a halftone negative representing one color. The halftone negative of each color is made through a color filter—a piece of

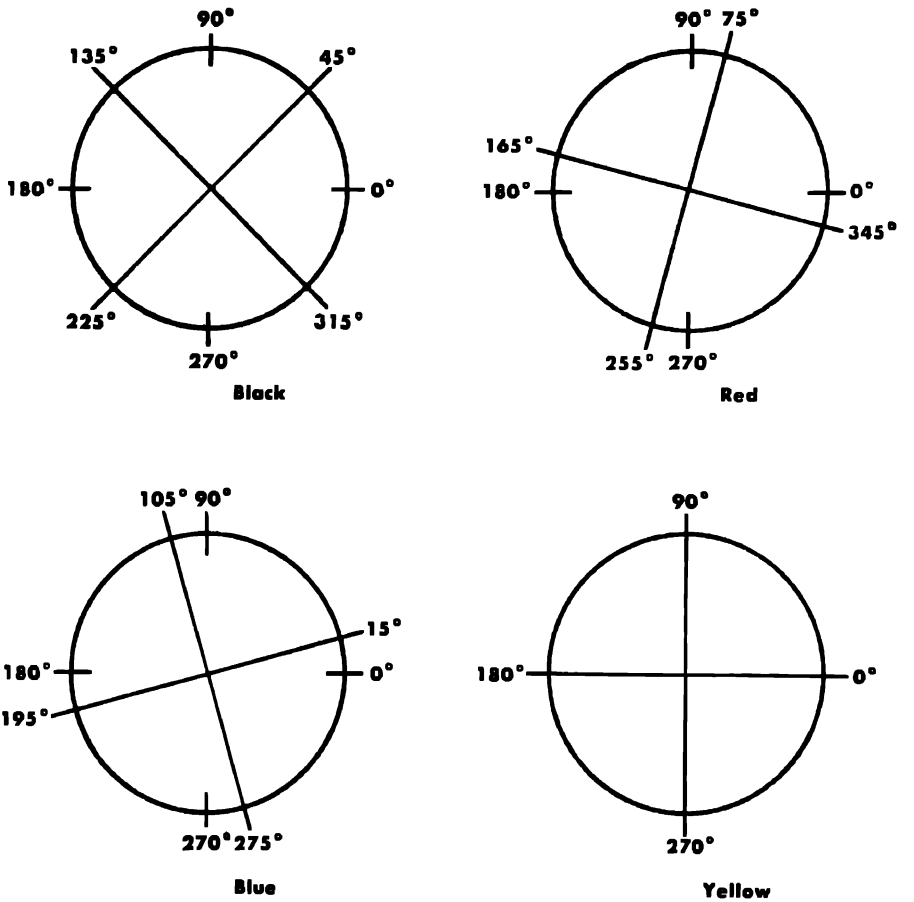


Fig. 2–7. Screen Angles for Color.

colored gelatin film cemented between pieces of glass—which is placed before the lens of the camera before the negative is made. Different color filters are used for each color negative or plate. A blue filter will absorb the yellow in the copy and provide for the yellow negative and plate. A green filter will provide for the red negative and plate. A red filter will give the same results for the blue negative and plate. In making

the black or key plate, the camera man in the photoengraving shop is guided for color by the subject or copy, after using a yellow filter.

Screen Angles for Color. As for the screen angles of the different colors on a four-color process job, the black remains as on a single color job; that is, at 45 degrees. As shown in Figure 2–7, the red is at 75 degrees, the blue is at 105 degrees, and the yellow is at 90 degrees; all are within the necessary 90-degree angle.

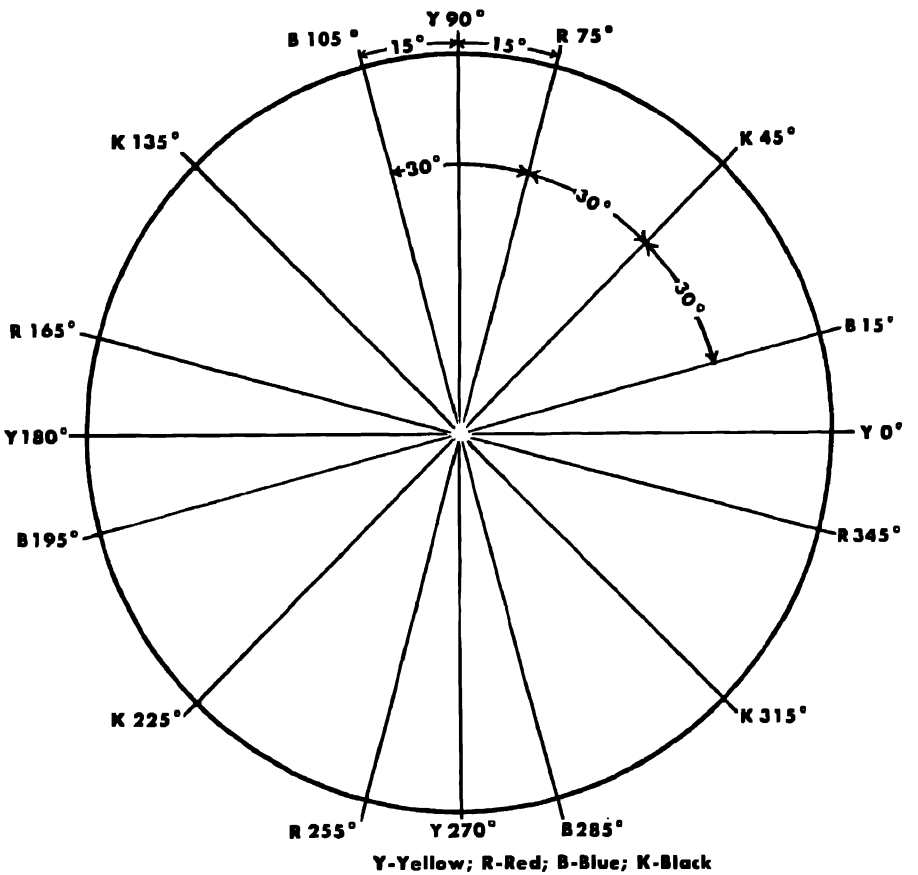


Fig. 2–8. Screen Angles for Color.

The purpose of this screen arrangement is to take the three strong colors, black, red, and blue, and space them as far apart as possible within any 90-degree angle—that is, 30 degrees apart, the black being at 45 degrees, the red at 75 degrees, and the blue at 105 degrees.

Because the requirements of each four-color process job vary and printing conditions are rarely the same, the arrangement or sequence of color is determined by the printer. For example, the printer may be

printing two or three other jobs in four colors at the same time. In order to economize in press time and ink, and to obtain uniform quality, he plans the color rotation for all current jobs. This plan is adhered to, and guides the engraver in making and proving the four-color plates. The engraver follows instructions by providing a set of progressive proofs, which are impressions of each of the four colors, printed in the specified rotation, overprinting, and in register. Specified paper and inks are used.

The usual arrangement of color in a four-color process job is: yellow, red, blue, and black. When the engraver proves his job in progressive form, he merely prints the yellow plate first; then the red plate is proved separately. In the next step, he prints the red plate over the yellow print, giving a two-color impression of the yellow and red. Following this procedure, he prints the blue plate separately, and then makes the same blue impression over the combined yellow and red prints, thus giving a combination of three colors, red, yellow, and blue, in register. Finally, he proves the black plate separately and then combines the black plate with the print of the combined three colors, providing a four-color proof. This method is known as progressive proving. It provides a set of progressive proofs for client and printer, either for correction or for proof of reproduction quality of the original copy. Progressive proofs number seven: (1) yellow proof; (2) red proof; (3) combination of yellow and red proof; (4) blue proof; (5) combination of yellow, red, and blue proof; (6) black proof; and (7) combination of yellow, red, blue, and black proof.

Progressive proofs help the printer in many ways. They insure good registration and enable the printer to maintain the quality of the printing plates by watching the colors reproduced step by step as the work progresses. They save the printer time in making ready. They eliminate guesswork, which would prove costly both in time and quality.

It is always advisable for an engraver to prove a color job in the same ink and on the same paper that will be used by the printer in the final printing. This practice provides a true reproduction and does not fake the quality. A minimum of make-ready should be used by the engraver. Mechanical requirements, inks, and sequence of colors of publications can be checked in Standard Rate and Data Service publications.

Registration. In any color-printing job, good registration is necessary. Good registration means that one color will fit against the next color in true alignment. To insure and obtain this essential quality, register marks are drawn on opposite margins of the copy in the shape of a cross; these marks are reproduced in all of the color plates. It is not difficult to place each plate in such a position that these marks print exactly over the same register marks of the previous plate. When each register mark prints exactly over the preceding one, the plates are in

exact register. The register marks do not show in the final printing, as they are removed after the alignment is set but before the actual printing begins.

THE MECHANICAL PROCESS OF PLATEMAKING

There is no great difference between the making of the line and of halftone plates. The ten major steps which follow are necessary to make a line plate on either zinc or copper (see also Figs. 2–9 through 2–24).

1. Exposure. The line drawing or copy is tacked onto the copy board and placed before the camera. The photographer adjusts the camera until he can see the image of the line drawing in the ground glass in perfect focus and in the size desired for the plate. The ground glass is then removed from the camera and replaced by a plateholder containing a sensitized wet plate. Powerful carbon arc lamps with reflectors throw light on the art copy while the photographer removes the plateholder and the cap from the lens. Length of exposure varies according to the nature of the copy.

2. Development. After exposure, the plate is removed from the holder in a darkroom and developed and fixed by washing.

3. Coating. The plate is dried and the film side is thinly coated with a transparent solution of liquid rubber cement The rubber-cement coating insulates the film from another coating which is added afterwards to give the film the necessary body for stripping. Again the plate is dried and this solution, known as stripping collodion, is poured on evenly and allowed to dry. These coatings become part of the negative film.

4. Stripping. The plate is allowed to soak in a bath of acetic acid until the film separates easily from the glass and can be conveniently removed in a sheet. The film is then stripped in reverse, or upside down, on thick plate glass, called a "flat." This procedure is necessary to provide the proper printed impression from the plate—i.e., so that it may read from left to right.

5. Sensitizing Metal. A piece of zinc about $\frac{1}{16}$ inch thick (known as 16-gauge metal), polished and burnished on one side, is sensitized on the polished side with a bichromated glue solution and then dried.

6. Contact Printing. The plate glass containing the negative in reverse is placed in a printing frame, film side up. The sensitized zinc plate is placed on top of the negative. The frame is clamped vacuum-tight to insure perfect contact between the sensitized zinc metal and the negative.

7. Developing Metal. The frame is set on edge, facing powerful arc lights. The light penetrating the glass exposes the sensitized metal. The metal is then developed, and the print fixed and washed.

8. Acid Resist. Before the print on the metal is ready for etching, the back of the plate is treated with a chemical resist. Certain portions of the printing side of the plate are also treated with the acid resist. This treatment expedites the etching of the plate, and also economizes in the use of etching acid.

9. Etching. The plate is now ready for etching. It is brushed with a resinous powder known as dragon's blood, which adheres only to the printed parts of the surface. The plate is now immersed in an acid bath containing nitric acid. The chemical acts only on the unprotected surfaces, and eats into the metal leaving a relief surface. After the first bite, the plate is washed and powdered again with dragon's blood, heated, and placed again in the acid. This procedure is continued until the plate is etched to the proper depth. The succeeding applications of dragon's blood, after the first bite, cause a widening of the lines that are to print; as they get deeper, the lines in relief take on the appearance of an inverted V. This process strengthens the lines and gives the plate the ability to stand up under pressure. Otherwise the lines would not be sharp, but broken.

10. Routing and Mounting. The next step is routing. The plate is mounted on a block, and excess metal is gouged or routed away by a rapidly revolving drill-like tool. Following the routing process, the plate

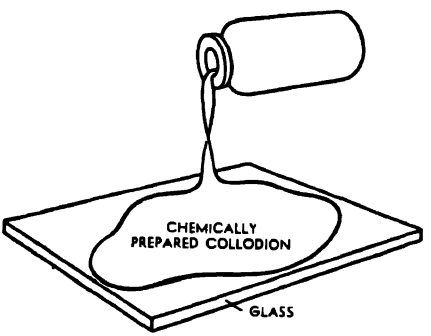


Fig. 2–9. Film Base. Collodion solution, containing necessary photographic chemicals except silver, is flowed evenly over glass plate, which has been previously coated with albumin, leaving a thin film on the plate. A pyroxylin base is used for wet plate negatives. Plain collodion plus castor oil is used to strengthen the films.

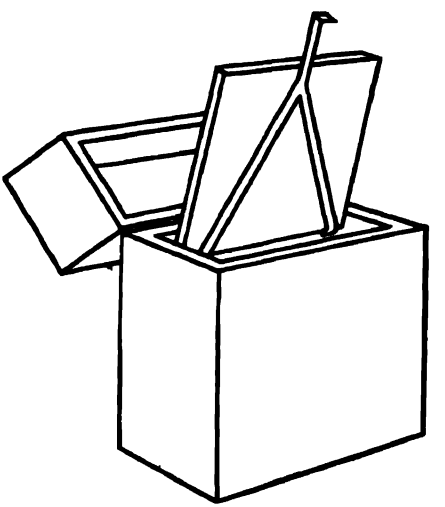


Fig. 2–10. Sensitizing the Film. In the next step, the glass plate is dipped into a solution of silver nitrate which makes the film on the glass sensitive to light and ready for the exposure.

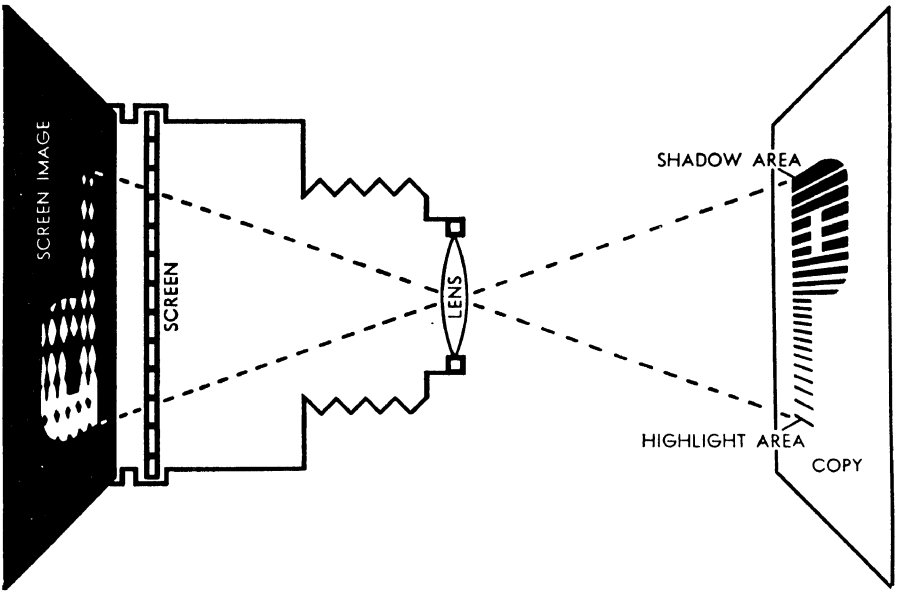


Fig. 2–11. Exposing. The sensitized plate is now ready for exposure to the copy. Toned copy is exposed through a screen which breaks up the copy into many dots. Negative on plate is reversed from top to bottom, left to right. Copy can be enlarged, reduced, or made same size. Color copy is exposed through desired filter.

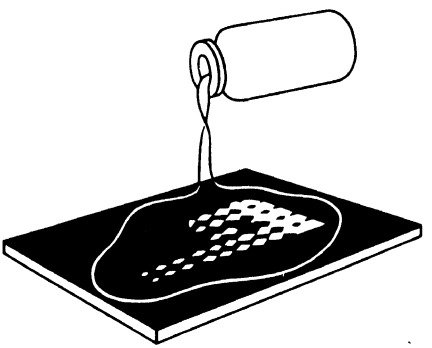


Fig. 2–12. Developing. Negative plate is developed.

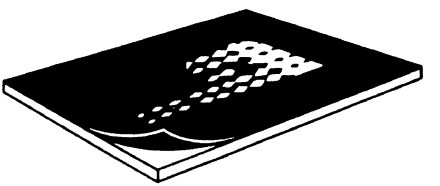


Fig. 2–13. Combinations. Line negative or halftone negative is stripped (peeled off) glass plate and accurately set up together on another "glass flat." Soaking the glass in acetic acid loosens the film.

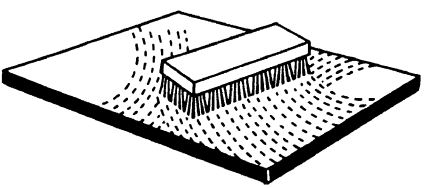


Fig. 2–14 (*Left*). Metal Plate. Plate, usually copper for halftones or zinc for line work, is prepared. First step is to scrub the plate clean before sensitizing.

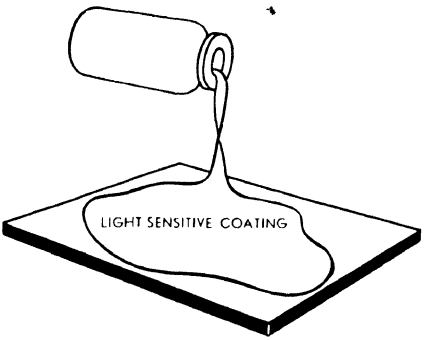


Fig. 2–15. Sensitizing the Plate. Plate is flowed with an entirely different solution —which may be either albumin, glue, or shellac sensitized with ammonium bichromate—and is ready for the whirling.

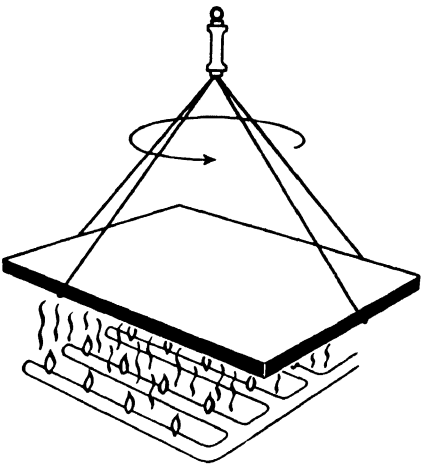


Fig. 2–16. Whirling. Whirling over flame tends to dry sensitized solution onto the plate surface and distribute it evenly over the entire plate surface.

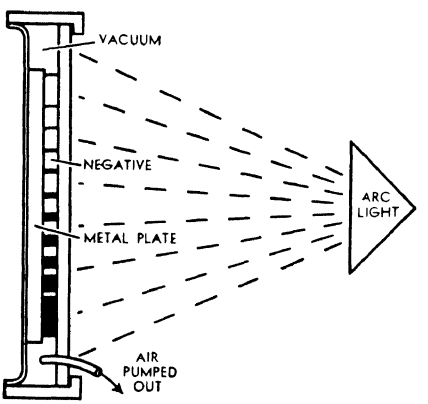


Fig. 2–17 (*Left*). Exposing Plate. Negative or negative group is printed on sensitized metal plate by exposure to light. Negative and plate are in absolute contact to insure sharp dot or line images. Air is pumped out of the holding frame. Atmospheric pressure acts to keep negative together with plate.

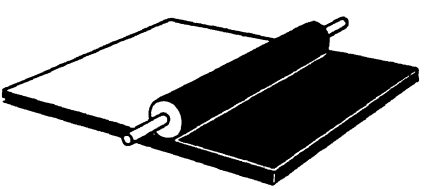


Fig. 2–18 (*Left*). Zinc Plates. Rolling "etching ink" on line plate makes printing area hold "topping powder," which strengthens plate's acid resistance.

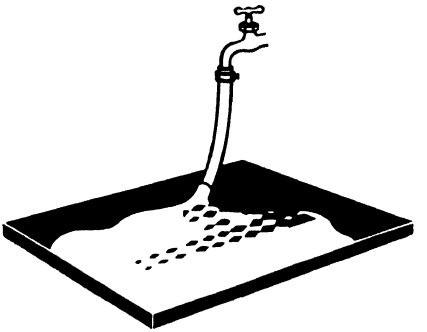


Fig 2–19 (*Left*). Developing Plate. Copper or zinc plates are developed by washing away all areas of resist not hardened by light passing through negatives. This uncovers metal so it can be etched. Those areas hardened by light do not wash away and so protect their areas from the etching acid.

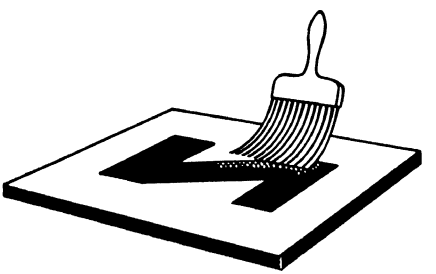


Fig. 2–20. Dusting. "Toppingpowder," dusted on developed plates, melts when heated and resists acid. Zinc employs a "cold enamel" or a shellac.

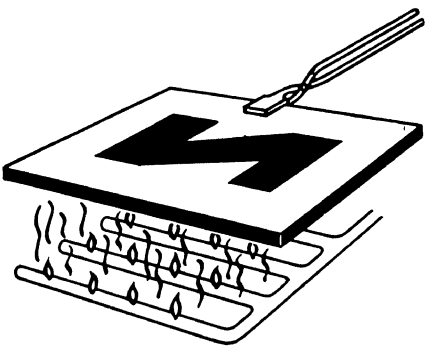


Fig. 2–21. Burning-in. Line or halftone plate with glue top or topping powder is heated over a flame and the powdered areas soon become acid resistant.

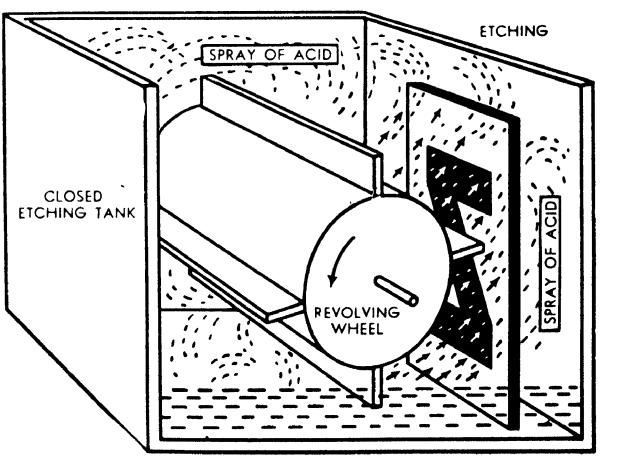


Fig. 2–22. Etching. Etching is done in a number of ways. Here the plate is placed in a closed tub. A revolving paddle wheel throws acid up against the plate surface, etching exposed areas to the proper depth. After first (flat) etch, nonprinting, acid-bitten areas are slightly lowered, leaving the printing areas in relief. Sides, or walls, of dots or lines, newly exposed, require an acid resist to prevent them from being eaten sidewise in deeper etching.

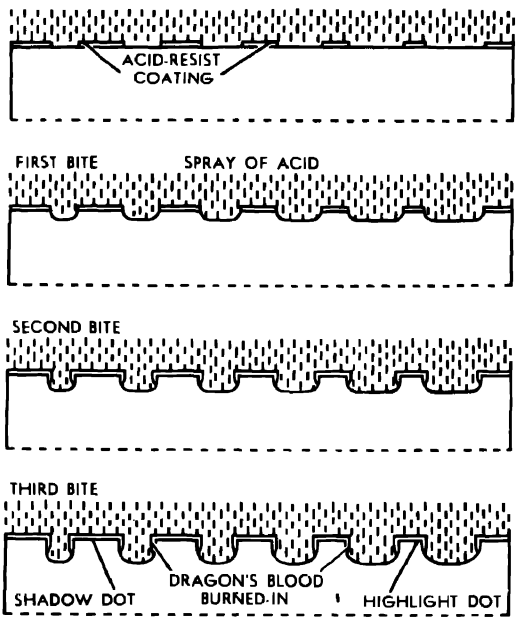


Fig. 2–23. Progressive Steps. Between etches the plate is washed free of acid. Powder (dragon's blood) is dusted on plate skilfully to form acid-resist coating on sides of the dots. This is brushed in from each of the four sides to insure protection of all sides of all dots. (See Figs. 2–20, 2–21.) Powder is not required in deep-etching plates with 120 screen or finer. Powder prevents undercutting.

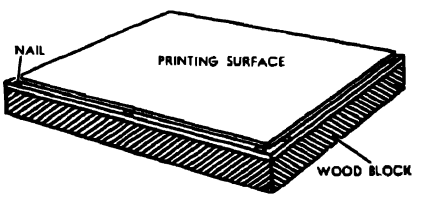


Fig. 2–24. Completion of Plate. The plate may go through a number of finishing steps, such as re-etching, hand-tooling, burnishing, trimming, mounting on wood block, and routing, etc., as the specific job may require. Some plates are made on "heavy metal" (.152 inch thick) and are left unmounted, but have beveled edges for use on patent base.

is removed from the block and mounted permanently on a type-high wood base.

PHOTOENGRAVING POINTERS

The efficient purchase and use of photoengravings can only be mastered after long experience. Since the paper stocks, presses, inks, and the quantity vary with each specific job, it normally takes many years to become sufficiently familiar with the situations in which engravings are to be used to specify and order them intelligently. Seasoned engraving buyers have submitted the following suggestions and pointers, carefully selected from their actual work experiences. Because the material in this area is so extensive as to be virtually limitless, what follows cannot be the final and definitive discussion. However, it does provide a great deal of specific data pertinent to the basic requirements for buying and using photoengravings.

Planning Plates to Fit Job. Since each job is peculiar unto itself, common sense, wisdom, and experience dictate that no cuts should be ordered until all printing conditions have been determined. The selection of plates may depend upon the choice of paper, or the length of the press run, or the fineness of the screen desired, or many other possible considerations.

To assure the desired results in the finished plates and to save time in preparation, certain definite precautions should be followed when ordering engravings. Specifications should include: type of surface; kind and size of screening, if desired; what crop, if any; papers for proofing and blocking; notches; mortises; heavy metal 11 point, for patent base (see p. 110); bearers for lead molds; kind of finish; square, no-line, square with line, outline, vignette, or any combination of these.

Most engravings can be completely controlled to provide the best possible results for any specific job. Usually an engraving may be adapted for any given purpose. For instance, it may be enlarged, reduced, highlighted, screened for a variety of effects, surrounded with any number of different borders, designs, or finishes, silhouetted, vignetted, reversed, etc.

In all cases, it is advisable to consult with the printer prior to ordering plates and also with reference to preparing copy for engraving. It is essential to determine the plate size before the finished art is assembled to eliminate the necessity of either reducing the art more than six times, or enlarging it more than twice the original size. Engraver's bills will show marked increases if these limits are not carefully observed.

To avoid a waste of paper, lock-up, and press time, the printer must specify the exact size of the plate needed to print bleed copy across the gutter or margin.

Depth and clarity of the original plates are essential if duplicate plates are desired. Therefore the engraver should be alerted to the use of the original plate so that these requirements will be met.

In catalog printing and similar types of work in which many plates of a similar nature are used, it is advisable to make one sample engraving prior to ordering the complete job. This precaution allows for the study of a plate's suitability, from every point of view, to the printing requirements.

Preparing Copy. Four methods are used to scale copy: algebra, drawing of a diagonal, a slide rule, or a proportion wheel. In marking the dimensions the first number is always the width; therefore, a 6″ × 9″ marking would mean 6 inches wide by 9 inches long. To avoid errors when marking for reduction or enlargement, specifications should be so exact that there is no room for question. The size and shape of all copy should be

clearly marked where solid backgrounds are involved. For further data on scaling, see pages 27–28.

In ordering reprints, the exact size of the plate itself, not the magazine or newspaper copies, must be checked. Because of the stretching incurred in stereotyping or printing, the printed piece may be inaccurate as a guide to the size of the original plate.

To indicate tint areas and colors, guide lines are used, but are never allowed to touch the copy, since they must be removed later. Red guide lines are effective and easily distinguishable. Light-blue lines are good for engraving copy, because light blue will drop out, although dark blue may reproduce. Guide lines in pencil must be taken out, since they will certainly reproduce.

Because all charges are made at regular scale price, dead-metal areas should be utilized. Empty corners or large blank areas are waste, and can be avoided by mounting other drawings scheduled for the same reduction on the original art and cutting them away when the cut is finished. Where a number of illustrations will be required, gang the job by mounting the various art to take the same reduction as one unit, leaving just enough space between each for cutting apart. Such a job can be bought as one plate with extra blocking.

In the copy prepared for photoengraving, all lines and solids to be held on the plate should be black, or they will upset the even black-and-white contrast necessary to the success of the entire process by photographing in various degrees of gray.

When a small design is shown in the border or pattern, only one unit need be prepared by the artist. This can be photographed or Photostated into the number of prints required to paste up the entire design pattern, with a resultant saving on art work. When the same borders and decorations are scheduled for opposite pages, two plates are necessary; the design can be reversed by instructing the engraver to turn the negative. This will eliminate the cost of an extra reversed drawing and will, at the same time, insure an exact duplicate on the opposite piece.

Clean original copy is an absolute requirement for halftone engravings, since each line and mark will reproduce exactly as in the photograph. Erasures on copy tend to gray down the proofs and result in poor reproductions.

Clips, marks, folding cracks, and other marks on copy will reproduce. Patches on copy will not blend or merge successfully and may easily spoil the entire reproduction.

Type for the advertisement can be set after the engraving is made so as to fill in the remaining space.

Line-plate Pointers. For pen-and-ink, woodcut, scratchboard, reverse drawings, black crayon, pebble board, or coarse-screen halftone proofs,

a zinc line cut is advisable; copper is preferred for finer work. In reproducing multicolor drawings, solid-color art areas, or shadings (with line or coarse dots), a line engraving gives clean highlights, sharp black-and-white contrast.

To save on extra charges for long, narrow engravings, pen-and-ink drawings may be made in several sections, and then placed close together in a vertical row. Such a drawing can be engraved, mounted, cut apart, and assembled on a long form by the printer.

For news copy, retouched quartertones are good, since they print like line cuts. Here Ben Day solids replace solid blacks over one pica, a substitution not permitted in metropolitan dailies, so that when the newspaper remakes the whole plate or grays down the solid portions, no detail is lost.

A shading medium and line cuts should be used when reproducing combination line sketches and flat tones. Solid-tint plates can be bought from the engraver, with heavy zinc specified if the plate is for use as a base. A halftone film or Ben Day overlay will lighten large heavy type.

Excessive reductions of line cuts will bring the lines too close together and cause blotching of the copy.

Line plates can print on any kind of paper, but fine plates may fill up on coarse stock.

In preparing art work, one should remember that about 200 designs are available in Ben Day screens, all of which can be reprinted off register, surprinted over other designs, or reversed for still more effects. The Ben Day tint must be chosen to suit the paper on which it will be printed; fine patterns, for example, are unsuitable for antique finishes. When using Ben Day or similar tints, it is wise to follow the advice of the engraver regarding preparation of art work.

Halftone Hints. In specifying the screen for letterpress, it is well to remember the limitations of the stock chosen for the printed job. An approximate guide is:

Newsprint, 50–85; Antique, 65; Eggshell, 65; High bulk, 65; Glossy coated, 133–200; Dull coated, 120–133; Semi-dull, 120–150; Process, 120; MF, 100; EF, 120; Super, 120; Offset, 110; Thin, 120.

Because halftones in 120 screen are versatile enough to print well on a large variety of papers, they may be adapted later to many other jobs. Halftones should contain as much contrast as possible, achieved by retouching or airbrushing. Retouched photographs for black and white should be okayed by the engraver before the plates are made.

Good reproductions in line and halftone need good copy. Asking the engraver to improve on faulty copy is costly and not always satisfactory. Photographic copy should always be clear and bright in order to guarantee

the best possible engraving results, permit the printer to run the normal ink, and cut engraving costs.

For best final results, coarse-screened copy should avoid fine shading and contrasts, as the size of the dots eliminates detail. A coarse screen is, of course, a must when a rough paper is to be printed upon. The additional ink required for rough-paper reproduction will squeeze out more and make it necessary for the valleys on nonprinting areas to be further apart. Deeply etched halftones with sharp tonal contrast show up best on antique paper. A thin sheet of rubber packing in the make-ready helps in this work, as its resiliency forces the form into the recesses of the paper.

Grainy photographs and stippled or pebbled art tend to accentuate the grain in reproductions, and should be avoided.

Soft-edge, silhouette, or vignette halftones and mortises are more expensive than the customary finish and require more make-ready time.

If you want to make a highlight halftone, you should note that they are not, as a rule, used for photographs, since the tonal gradations are too fine to register in the reproduction of the outline of the highlighted areas. Often photographs require retouching in highlight halftones for good results. The best results in this type of halftone are obtained from pencil work, dry-brush, charcoal, and wash drawings.

For sharp, black prints from halftones, the photoengraver should be informed of the exact effect desired, and he will make the plate accordingly. At a light extra charge he can prevent the development of a screen in solid areas, and avoid added make-ready.

The production man should note that poorly lighted photographs cause most of the troubles usually blamed on the engraver by the printer. If the original job is done right, there will be no reason for unsatisfactory reproductions and extra engraving charges for corrections.

To rephotograph halftones the camera should be thrown slightly out of focus, or the screen moved behind the camera to eliminate the screen pattern.

For burnishing and re-etching, copper halftones are preferred to zinc, because of the structure of the metal and the resist used. To secure extra emphasis in the illustration, it is wise to use halftone for only part of the copy, and to gray down the rest. Screened-tint plates require re-etching at an additional charge, figured at halftone or Ben Day rates.

It is desirable to bear in mind that combination (line and halftone) plates are more expensive than ordinary halftones, because they require two negatives, deep etching, routing, trimming, and special handling. To prepare combination plates, two separate negatives are made—one line and one halftone when a screen tint background is to be used or when line copy has to be reproduced in halftone in composite subjects.

The two negatives give the finished print all the crispness of line work.

It is always well to bear in mind that when one large cut will be less expensive than many small ones, several halftones for the same area of a single page may be ganged together for the same reduction, as has already been suggested on page 52.

The greatest depth advisable for newspaper halftones is highlight depth—.008 of an inch, which will usually give a clear reproduction. In newspaper work, however, second-impression pages give better halftone results. These pages, backed up, have a tendency to cover any printing which may show through.

Used primarily in newspaper work, quartertones add to the cost of a job, but tend to sharpen the detail in coarse-screen halftones.

Color Hints. Colored copy can be reproduced in black and white with orthochromatic emulsion, or by a panchromatic photograph of the subject which reproduces colors in comparatively gray tones. On a one-shot camera, a set of separation negatives is made on one exposure; process color plates, offset, or gravure can be made from these negatives with the highest quality results. Special treatment for camera separation is required by certain color combinations; for example, black over deep orange. The ordinary wet plate is red blind and blue sensitive, so that red reproduces black, and blue reproduces white. Hence, certain colors, such as light blue, will not reproduce in black-and-white cuts. Increasingly popular are black-and-white prints made from color-separation negatives which permit careful retouching for color correction. The filter for a red negative is green; for a blue negative, red; for a yellow, violet; for a black, yellow. The filter separates the colors.

Corrections are rather expensive and less perfect in color photography than in black-and-white work because of the larger number of variable factors, so that greater accuracy is essential. Retouching on color work requires meticulous treatment. Halftone colors do not reproduce in the tone values seen by the eye; blues reproduce lighter and browns become darker.

Water colors or oil paintings reproduced in black and white should have a fine-screen copper halftone. For newspapers they require a coarse screen but delicate tone gradations may be lost.

Newspaper color comic strip ad plates should be deeply and cleanly etched. Several sets of progressive proofs should be submitted on newspaper color work, one each for the pressroom, ink man, and routing department.

An efficient method of reproducing pictures in three and four colors for newspapers is the Ben Day color process. Only one negative is necessary, eliminating the job of color separation. The black plate alone carries

the image, affording a better control of color and making printing simpler for the pressman. When a colored original is not at hand, faked colored effects may be achieved with fake process color plates, which require skillful etching but save the cost of new original copy. Screened prints may be used where the superimposing of two or three colors is required, and can create almost any desired effect. To avoid etching on separate plates to achieve register, portions to be run in several colors and tint backgrounds can be engraved simultaneously after being traced from key drawings.

Agfa, Dufaycolor, etc., are screen transparencies from which color plates can be made. They require careful manipulation to avoid the catching of the screen grain in the pattern. Kodachrome, Ektachrome, and Ansco Color, of course, are screenless.

By making plates for color transparencies, it is possible to mount several together on one plate, and then to cut them apart. Plates made directly from color transparencies not only are highly satisfactory, but also save the cost of prints. On the other hand, such plates add to the engraving costs. For color subjects, single-exposure color-process miniatures are generally used.

Proofing Cautions. The engraver should have samples of the paper and ink chosen for the printing of a job, especially when process color work is involved. The samples will serve as a guide to proper etching of halftones and enable him to pull proofs that will closely approximate the appearance of the finished job. All process color plates that will print in one ink feeding should, if at all possible, be proved together, so that the regulation of the inks will show up any color imperfections on one plate at the expense of the others, and any necessary retouching of the plate can be done before the initial run. Before the run is started, progressive proofs should be studied under glass to eliminate the possibility of any trouble from faulty highlights, bad register, and other defects. Only if the register is close or an exact shade is vitally important, is it necessary to ask for color proofs in advance. For reliable results on a job to be wet-printed, progressive proofs should be pulled wet, on identical stock and ink, and in exactly the same sequence as will be followed on the finished job.

Miscellaneous Hints. When a cut is to be blocked at an angle, it should be ordered loose-blocked, so that the compositor or printer can block it at the proper angle on a square block. This will eliminate the wedging of odd-shaped blocks and save on make-up time.

Blocks should be ordered the exact column width of the type material, to permit a reduction in make-up time by blocking to exact pica width. When plates (either electros or originals) are mounted on wood blocks,

the grain of the block should run around the cylinder for best results in printing.

Printing plates (originals or electros) 8½ × 11 inches or over in size are cut with a 6-point saw in one direction through the center of the wood block right up to the metal. A slug is then cut to the exact height of the wood block, shellacked on both sides, and inserted into the saw cut. This process is repeated through the block the other way. The metal plate is never cut. The edges of the block are shellacked again, especially at the end-grain edges, to prevent the warping of new plates of large size. This is known as anchoring.

After a job is finished, the cuts should be filed for future use. For easy identification, the card for each cut may carry an identifying number which includes size of the width and depth; for example, #110¾, would show that cut 110 is 2 inches wide and 4 inches deep. This type of listing eliminates the necessity of pulling a proof on a filed cut to determine whether or not it will fit into a given space on another job. The number alone will afford this information.

Always remember that old plates can be reused by trimming to new shapes, printing in different colors, eliminating the backgrounds, or running with a tint plate wherever possible. These devices lend a fresh appearance to old work and are less expensive than preparing new cuts.

SOME NEW DEVELOPMENTS

Fairchild Photoelectric Engraver. The Fairchild Photo Screener is an "electronic halftone camera" designed to produce screened positives or negatives from continuous tone copy, either black and white or color. Cut, sheet, or strip film may be used. The operating principle of the Photo Screener is photoelectric rather than photographic. It differs from the standard photoengraving camera in that there is no copy board, track, or arc lamp arrangement—not even a lens, or screen, as such. It is a self-contained, compact unit about the size of a standard desk.

Here briefly is how it operates: A pin point of light is projected onto the copy and reflected back into a photomultiplier. The reflections vary in intensity from strong "highlights" to weak "shadows," with middle tones falling proportionately in between. These reflections are amplified thousands of times, then converted into dots of light which are exposed one by one on film at the rate of about 2000 dots per second.

By means of built-in automatic controls, dot size may be expanded or reduced to obtain desired results. Photographic originals may be reproduced exactly or modified to any range of tone or contrast. These electronic controls can be used to improve reproduction quality; the degree of control is greater than has been possible through photography.

With one exposure the Photo Screener will accomplish results usually

achieved with two- or three-stop exposures. Simple settings of the controls alter the reproduction curve so that detail, flash, or highlight exposures become unnecessary. The Photo Screener's built-in controls will allow flat copy to be increased in contrast or high-contrast copy to be subdued and softened. The contrast value of shadow, highlight, or middletone areas can be selectively altered to a degree never before possible.

Another application is the selective "editing" of photographs or art work. Under skillful operation, difficult dull-black copy can be reproduced with fully defined details or a high-key portrait, stiff and severe, can be made full-bodied and warm with a full range of tonal values. The Photo Screener can be used to deliberately distort or completely reverse the tonal range to produce unusual effects.

The production model Photo Screener will enlarge and reduce automatically to four and one-half times original size. A copy table will take mounted or unmounted originals, singly or ganged, up to 18 × 22½ inches. Various combinations of screens are offered.

Electronic Engraving. Electronic scanning equipment represents a new and interesting innovation in letterpress engraving. First introduced to the graphic arts field some years ago, it is now used extensively by many newspapers as a quick, low-cost method of making coarse-screen halftones. This has resulted in more newspaper illustrations, thereby improving appearance and enhancing reader interest.

Today, electronic scanning equipment has been widened in its scope and now includes 65, 85, 100, and 120 line screen engraving machines. The Fairchild Scan-A-Graver has four principal parts: the copy cylinder which holds the photograph or drawing from which a halftone is to be made; the scanning head which contains the photoelectric cell and the light projector; the engraving head which contains the heated stylus and stylus motor; and the engraving cylinder which holds the Scan-A-Plate to be engraved.

When the machine is in operation, both cylinders revolve on a single shaft and a pin point of light is projected onto the copy. The light is then reflected back to a photomultiplier scanner, varying according to the tonal densities of the picture. The light impulses are then transmitted through amplifiers to the engraving head where a pyramidal-shaped stylus is mounted. The stylus penetrates the plastic parts and burns out small segments, varying in area and depth. The unburned portions of the plate thus constitute a raised surface, which is the halftone cut. Neither etching or hand-tooling are required.

Length of operation depends on the size of the illustration. The 120-screen machine requires 3.5 minutes per linear inch of copy. A 2¼ × 4-inch halftone takes 8 minutes while an 8 × 10-inch plate takes 35 minutes. The Scan-A-Graver, however, is limited in scope to same

size copy. If a blow-up or reduction is required, this must be accomplished photographically as a preliminary operation. The resulting photo, scaled to correct size, is then wrapped around the copy cylinder, face up, for reproduction.

The actual operation of the machine is simple. The operator selects the darkest portion of the photo, places the pin-point light on it and reads the meter. Then the light is shifted to the lightest area of the photo and a reading is again taken. The operator then adjusts his black or white control knobs to a desired density and is ready to engrave the plate.

While the machine is in operation, the meter indicator reflects the tone level of each dot being cut. If desired, the operator can observe the cutting through a microscope and vary the size of the dots by the simple turn of a knob. The dots are pyramidal in shape. While the width of each dot varies in accordance with the tonal value of the copy, the depth varies from .0025 inch in the shadow areas to .0077 inch in the 120-screen highlights.

Proofing of cuts is the same as with conventional photoengravings. In mounting, dead plastic (unwanted surrounding areas) is trimmed off. Double-sided Scotch tape is then placed on the back of the plastic and pressed onto mounting wood or metal. No nails are used and all cuts are flush-mounted.

Despite the success of the Scan-A-Graver, there was an obvious need for equipment that could either reduce or enlarge directly from original copy. This would have the two-fold advantage of greater fidelity of reproduction by avoiding an intermediate step, as well as shortening the time required to make a halftone. This led to the production of the Scan-A-Sizer.

The Scan-A-Sizer is an improved Scan-A-Graver that will enlarge or reduce and engrave in a single operation. The engraving methods are the same, but the scanning method is different. The copy to be reproduced is placed on a flat drawerlike projection which will accommodate material up to 18 × 22½ inches in size and as much as ½ inch in thickness. The scanning is done by a pivoting mirror which oscillates back and forth across the copy. At the same time, the copy table recedes slowly into the machine until the job is complete.

As in the case of the Scan-A-Graver, light densities are affected by the tone values of the copy, resulting in varied dot sizes. Reductions or enlargements of copy can be decreased or increased four and one-half times. This would permit a 35-mm contact print to be enlarged to approximately 4½ × 6¾ inches. A 3 × 4-inch Polaroid camera print can be enlarged to 12 × 16 inches. An 8 × 10-inch glossy photo can easily be reduced to a one-column cut in similar routine fashion.

Thousands of newspapers are using this electronic, plastic, original

engraving as a quick, convenient, low-cost method of producing halftone plates. Economy is an important feature. With printing costs rising constantly, a plastic original which can be purchased at savings of 20 to 40 percent compared with photoengravings is a matter which merits serious consideration. Speed is another factor. The plate can be produced in a fraction of the time required by the conventional process.

There are some limitations to the new processes which have to be considered. First, line cuts cannot be made by this method at the present time. Second, silhouette halftones can only be made by subsequent mechanical operations, such as cutting away the unwanted screen area with a sharp tool. Third, while lead and tenaplate molds can be used, Vinilyte molds cannot be used because approximately 300 degrees of heat are required.

Electronic engraving and plastics have invaded the graphic arts. Being new processes and new materials, we tend to look upon them with some misgivings, especially when they have limitations. To evaluate a new product fairly, we must consider advantages and disadvantages. We should study its capabilities and limitations and become thoroughly familiar with them. Then we ought to exploit the advantages to the utmost—realizing at the same time that we must of necessity take some of the bad with the good. In this manner we shall discover new tools which we can use to our over-all advantage.

SOME PHOTOENGRAVING TERMS

Asphaltum. This is a viscous, dark brown, liquid mineral pitch, used in photomechanical engraving processes. In etchings it is used to stop out or cover certain parts of the plate in order to prevent the acid from attacking these parts.

Bac-etch. A photomechanical premake-ready process in which the face of the plate is prepared and etched in the normal manner. The same image, reversed, is then reproduced on the back of the same plate in precise register with the top surface. In this light-ray diffusion method, all highlights and disconnected middle tones are dropped out, and all shadows and connected middle tones are solidified. The original face of the plate is then protected and the back is etched. The Bac-etch original is next prebumped, recessing the highlight and middle tones to the depth etched out of the back. The method broadens the previously used manual double-jump process, which was usable only for newspapers, or the manual McKee process, to all kinds of plate users. Its cost is said to be 10 to 25 percent of the cost of the original.

Ben Day Pattern. Ben Day is a process for producing shadings in line engravings. Gelatin films, with designs (dots, lines, and other textures)

in relief, are available and these film sheets are inked and transferred to the metal plates. After being covered with resin, which adheres to the ink and is burned on, the plate is etched. Ben Day patterns may be used n single- or multi-color work.

Beveling. Rectangular plates are put on a beveling machine to make the ⅛-inch channel which is used to nail plates on wood. Black-and-white lines are also put on plates with the machine.

Bishop Process. This is a method for applying premake-ready to electrotypes. Three-layer laminated paper is used. Plate areas to be raised or lowered are hand-traced onto the matrix paper and layers peeled off where desired. A male and female matrix are cut and applied to front and back of plate. Steel pressure rollers cause matrices to raise solids .002 inch and lower highlights .002 inch below the normal travel line of the press. Press make-ready is claimed to be considerably reduced by this process.

Bleed. Extension of an illustration beyond the trim mark on the sheet is known as a bleed job. The blank margin left around the printed page is not sufficient, and trimming the page to proper size cuts into the print allowing the illustration to print to the edge of the paper.

Blocking Flush. This term means trimming the mounted plate and block flush or even with the printing surface; it is sometimes called flush blocking.

Burnishing. The act of rubbing a halftone plate with a polished steel burnishing tool to darken printing areas of the plate by spreading the dots is called burnishing. It is another term for glaze, sometimes restricted to friction glazing and flint glazing.

Chalk Plates. A chalk plate is a form of engraving on a steel plate that has been coated with a chalky solution. The process is used chiefly for the reproduction of cartoons and simple line drawings, and by small papers that lack photoengraving facilities.

Collodion, Stripping. Plain collodion is used with castor oil to strengthen film before it is stripped, and as a coating on wet plate negatives.

Color Filter. A color filter is a sheet of stained gelatin between glass used in photographing colored objects (colored glass or a colored solution is also used) to equalize the tone values by holding back certain rays of light and allowing others to pass through. Red or yellow is used when the original contains much blue. Red, yellow, orange, and green cannot be photographed successfully without a filter.

Corrected Negatives. These are negatives for color printing made by using a combination of three-color negatives, their corresponding positives, and the negatives therefrom.

Crossline Screen. This is a halftone screen having lines crossing at right angles as distinguished from straight-line screen having no crossline.

Dragon's Blood. Originally an exudate from *draoeme draco* or *calamus draco* trees, dragon's blood is used in the etching process as an acid resist. Today a synthetic powder is used.

Dropout Halftone. A dropout halftone is one in which the highlight dots have been etched away so that the plate can be deep-etched; it is correctly called a highlight halftone.

Engraver's Proof. This term is used for a careful impression of an engraving made on fine paper with good ink, and furnished by the engraver. The engraver's proof is usually made on a hand press with the engraved plate resting on a solid metal base, the inking done with a hand roller and the sheet taken from the plate with care.

Fake Process. In photoengraving, the making of two, three, or four halftone negatives, at proper screen angles, from black-and-white copy or photographs is called a fake process. It is used as a substitute for the method of employing true color separations only when the latter is impracticable, as may be the case in making color plates of large oil paintings, flower gardens, landscapes, etc. Some very pleasing results are obtained by this process.

First Bite. In making a line engraving, etched on zinc, usually at least four separate etchings or bites are required in order to obtain the proper depth. The first etch, or the time that the plate is immersed in the etching acid before the first blooding-up is called the first bite.

Flat Proofs. Individual prints made from each plate in a color series are called flat proofs.

Gamboge. Gamboge is a gum resin, soluble in water; it is used for stopping out areas on printing plates for the purpose of laying tints.

Halftone Screen. A halftone screen is an accurately made grating or mesh consisting of two pieces of clear, finely polished glass, each piece about ⅛ inch thick and ruled with parallel lines. These rulings are first cut in a special resist and the lines are then etched into the glass and filled in with an opaque substance. Both pieces of glass are then cemented together with balsam, so that the rulings on one glass are set at exact right angles to the rulings on the other. This produces a grating

of crossed lines, leaving transparent square apertures. The area of each aperture is approximately the same as the area of the intersection of any two black lines. This relation can vary slightly in different screens, but the correct relation is 50 percent black and 50 percent transparent. Halftone screens are made of optically clear glass, and it is quite essential that they be free from any imperfections which might distort the image or in any way prevent its perfect reproduction. The screens vary in size and in the number of rulings to the inch. The usual number of rulings to the inch on different screens is 50, 55, 60, 65, 85, 100, 110, 120, 133, 150, 175, 200, 300, 400.

Highlight Halftone. A highlight halftone is one in which portions of the halftone plate have been etched away by photomechanical process, to lighten or entirely remove the printing dots, permitting that part of the plate to print little or not at all, thus emphasizing the highlights.

Moire. The undesirable pattern formed by conflict between halftone screen and lines or dots on copy is called moire. This results when a halftone print is used as copy for making another halftone plate.

Mortise. A mortise is an open space cut out of an electrotype or stereotype so that type matter may be inserted. Mortises are of two general classes: outside mortises are made on the edge of the plate, and inside mortises within the borders of the plate. Outside mortises are also known as notches.

Name Plate. The name plate is the name of a newspaper as it appears on the first page and at the top of the other pages.

Notch. In photoengraving, a notch is the cutting away of a small part of the block of an advertising plate, usually for the insertion of a key number. It is also known as an outside mortise.

One-way Screen. A halftone screen in which the lines run one way only, not intersecting to form dots, is termed a one-way screen.

Primary Colors. Yellow, red, and blue are pigment primaries. Blue, red, and green are primaries of light.

Quartertone. Coarse-screen halftone plates made by enlarging smaller halftones are called quartertones.

Re-etching. By subjecting a halftone plate to further etching, re-etching deepens the space between the printing dots, makes the tops of the dots smaller, and provides better printing qualities.

Register Mark. In electrotyping, a register mark is a scribe mark on the casting equipment to correspond with scribe marks on the mold for definite positioning of the mold for precision performance.



Fig. 2–25. Example of a Reverse Plate.

Reverse Plates. Printing plates reversed photomechanically in black and white are called reverse plates (Fig. 2–10).

Routing. On an engraving or plate such portions of the metal as are not needed or would be likely to leave a blemish mark on the printed sheet are cut or routed out. This is usually done mechanically with a revolving drill called a router.

Rubbing Down. Rubbing down consists of reducing or cutting down the printing strength of the image on a plate.

Surprint. A print from one negative superimposed upon a print from another negative is a surprint. It is most often used to produce black line or type copy over a light-tone background. The surprinting operations consist of coating the metal and making the print from one of the negatives. After burning in slightly to be sure that the print will hold, the metal is coated again and the second print is made on top of the first one.

Tint Block. A tint block is a plate to be used in printing a light flat color. It can be either a solid plate or a screened plate with the same size dots all over so as to produce an even tone.

Tone Value. The depth or strength of the negative or positive at any specific point is called the tone value.

3

TYPOGRAPHY

The whole development of the printing industry resulted from the invention of movable type. Type consists of little blocks of metal, each block having a letter carved or molded in reverse on one end. These blocks are set side by side to form the words and lines of a page to be printed.

The art of printing from movable types was preceded by many centuries of development in related arts. The early history of printing is closely related to the development of writing and the development of the alphabet.

The first type letters in the middle of the fifteenth century followed closely the form of the letters used in hand-written books. But some printers began to make new designs. The German printer, Adolph Rusch, in 1458 was the first to use roman type in place of the "black letters," and Nicolas Jensen brought this style to high perfection in Venice about 1470. Today, roman is the common style used in books, magazines, and newspapers.

Aldus Manutius, the famous Italian printer, in 1501 introduced the light-faced, slanting style of type which we now call italics. Many other early printers designed beautiful type faces, notably Ludovico Arrighi of Italy in the sixteenth century and William Caslon of England in the eighteenth century. The most famous American designer is Frederic W. Goudy.

During the 500 years since the first movable metal type was cast, thousands of different type styles have been created. Such men as Richard Pynson, Claude Garamond, Christopher Plantin, John Baskerville, Bodoni, and William Morris are some of the famous type designers whose types are in almost all of the printing shops of the western hemisphere.

Actually, the first great invention in typography was that of forming each letter of the alphabet separately from lead so that the letters could be rearranged and a succession of pages formed, thereby avoiding the labor of cutting new wood blocks for every page. Credit for this is given to Johann Gutenberg of Mainz, Germany.

From this significant step came the developments and inventions in the graphic arts field which have developed it to such a great extent today. This has made possible our modern newspapers, magazines, and general printing industry.

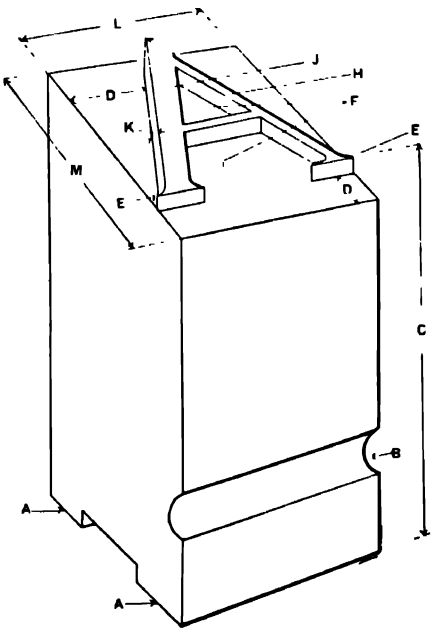


Fig. 3–1. Anatomy of a Type Face.

A. Feet. Type that is loosely spaced and leans over when printed is called "off its feet."
B. Nick. Helps compositor to place type right side up in stick. Keeps him from using wrong font.
C. Type-high, or height to paper .918 inch or approximately $11/12$ inch.
D. Shoulder. Nonprinting area surrounding a character.
E. Serif.
F. Counter or void.
H. Thin stroke of face.
J. Thick stroke of face.
K. Neck, beard, or drive. Made in matrix while casting, rest is made in the mold.
L. Set or set width.
M. Point size.

An essential part of the production man's armamentarium is a profound knowledge and appreciation of typography—the art of specifying and setting type. Rarely does an advertisement appear in which there is no type matter. Virtually every advertisement has some reading matter, however limited. And the medium for conveying that reading matter is the type. Therefore, type becomes an integral part of the message. Most often, the reading matter is prominent. Certainly it is important, no matter how little space may be devoted to it. Naturally, in selecting type, readability must be the most important consideration, to the extent of its priority above design, arrangement, style, color, and harmony. Long before the production man can specify type intelligently, he must be completely conversant with the role type plays in communicating the sales message to readers. He must be well aware of the contribution

of different type arrangements to the over-all pictorial design of the page. He must understand that, purely from the point of view of appearance, readers may be attracted to or repelled by his selection of a size or style of type for the headline or a prominent block of copy. He must know, too, that the type he selects has an emotional value and may convey mood or feeling; that suitably selected type can give emphasis, color, harmony, and design to the reading matter. The result of the effective use of all these factors is the essential readability of the type matter and the forceful expression of the sales message, which is of vital importance to both advertiser and editor.

Long before learning to read was considered the birthright of the common man, type was invented to speed communication. The development and evolution of type has its own colorful history. The first printers made impressions from reading matter engraved by hand on wooden blocks. Eventually, individual letters were engraved on wood and then combined into the necessary forms. After the discovery of this technique, metal blocks replaced the wood, resulting in hand setting as the most common method of printing. As more people learned to read, and as the necessity for an abundance of printed matter developed, the evolution of typesetting continued toward its present status. Today, mechanical methods are used to set type—i.e., Linotype, Intertype, Monotype, and Ludlow. Each of these methods of typesetting is used to achieve a particular advantage in regard to economy, speed, and quality of production.

Hand Setting. Hand-set or foundry type affords the greatest possible latitude in designing a page of reading and display matter. Each character in every headline and every phrase, sentence, and paragraph is set by the compositor by hand, according to the style, size, and arrangement specified in the layout.

Hand setting is used mostly for work where the reading matter is not too great. It is also indicated when special type faces are specified for dignity, individuality, emphasis, or the expression of an unusual thought. It is the most expensive method of typesetting, but its value more than equals its cost in effectiveness, beauty, and readability.

The typographer who sets type by hand is equipped with a composing stick (Fig. 3–3). This is a metal tray which the compositor carries and which holds each character as it is taken from the type case (Fig. 3–2). The type is arranged by word and line, with one side of the stick open so that it is adjustable to various lengths. The type is set to read from left to right but is upside down, so that in printing it is reversed and reads correctly. The type is held in place on the stick by the typesetter's thumb. To assist the typographer in handling the type, composing rules are sometimes placed in the stick to mark the length of the line specified. These

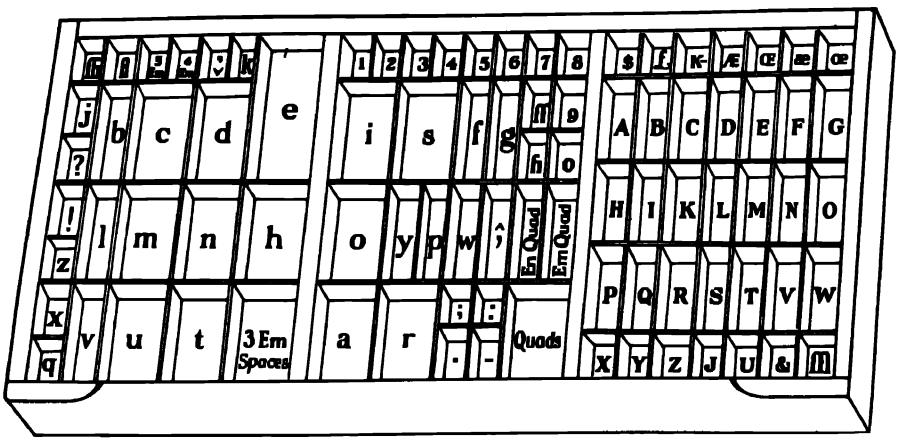


Fig. 3–2. California Job Case. In this kind of case (*above*), the section on the right holds the capital letters. Lower-case letters, figures, punctuation marks, and spacing material occupy the middle and left sections. Characters are so arranged in the case that common letter combinations are close together. The size of the boxes for each character varies with the probable frequency of use of the character. The California job case is the most widely used, approximately nine tenths of all cases being of this kind. Standard cases are $32\frac{3}{16} \times 16\frac{5}{8}$ inches and are interchangeable in case racks. Case racks are cabinets or stands that hold a number of cases. Although smaller size cases (two thirds and three quarters) are made for plants with limited space facilities, the basic layout of the case is as pictured here. Special cases are designed for foreign language and accented letters, music type, etc. Triple and quadruple cases are used for fonts of such faces as Lining Gothic, Engravers Roman, and others that consist of all capital letters. Cases such as these hold three or four such fonts.

rules are made of brass or steel and are .918 inches high, the same height as the type.

Good type composition is readily achieved by hand setting, which allows for good spacing. Proper spacing between letters and words not only fills the desired measure, but adds to the readability and tone of the line. The typesetter is assisted by quads and point spacers in completing his job satisfactorily. Quads are em spaces of any given size of type, while en quads are one half an em. When less space is required between letters or words, the typographer works with thinner spacers that measure three, four, or five to an em, and hair spaces. All these aids are used discreetly by the typographer to fill the line properly and maintain uniform-appearing space areas between letters and words.

In setting more than one line of type, either for display purposes or text matter, the typographer uses leads. Leads are metal strips less than type-high, 1 to 4 points wide. Leads thicker than 6 points are known as slugs. Use of leads or slugs between lines in any of the above-mentioned sizes permits typographers to fill any specified depth and helps increase and insure readability. When for any reason no leading is used, the set

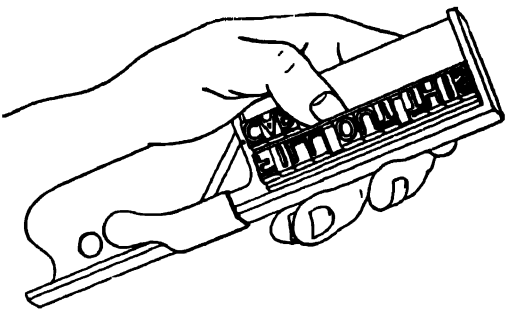


Fig. 3–3. Composing Stick. The compositor or typesetter holds a composing stick in his left hand, and with his right picks up the type characters one at a time and assembles them in the stick, spacing out his words with thin spaces and quads (low, nonprinting pieces of type metal). In this way, he justifies his lines, making all lines exactly the length called for. Modern composing sticks are about 2 inches wide by 10 inches long, are graduated to pica and half-pica settings, and have a movable metal bar or "knee" for adjusting space to the desired measure. When his stick is filled, the compositor places the lines of type in a long, shallow metal tray or galley. The galley is about 24 inches long and normally holds a total of about 20 inches of type in all.

copy is known as type, set solid. Large display headlines, however, require leading between lines for quick, easy reading and balance of space. In specifications for the typographer, the amount of leading desired is commonly expressed, for example, by 10 pt. on 11, meaning a 10-point type face set with a 1-point lead between each line; 10 pt. on 12 denotes a 2-point lead between lines. (See Appendix II, pp. 251–307, for examples of foundry type.)

America's most famous type faces are among those shown in Appendix III, Linotype, and Appendix IV, Intertype, pages 309–331. All but one were designed in the United States; that one is a notable example of how American abilities adopted a seventeenth-century face.

Two of America's greatest type designers have created most of the faces shown here. The late William Addison Dwiggins made a distinguished contribution to American type art. His Caledonia is the most widely used face ever cut in this country. Since its introduction in 1940, forty-four of the Fifty Books were set in it, for instance, and it is a prime favorite for every kind of printing. Rudolph Ruzicka, a close friend of Dwiggins, designed Fairfield, Fairfield Medium, and Primer.

Caledonia has great versatility. Its color is excellent for reproduction by letterpress, offset, or gravure. Its wide range is augmented by 21 and 27 point in addition to the normal sizes, and a condensed version is available in the 36-point size. (The body of this book is set in 10-point Caledonia.)

The Metros, first faces designed by Dwiggins, give a pleasant calligraphic touch to the more formal sans serifs. Here, too, is a wide range, from 6 to 42 point, and in four weights, Metrothin, Metrolite, Metromedium, and Metroblack.

Electra had its seed in the distinctive handwriting of Dwiggins. He translated it into a face that is truly modern, yet so classically perfect that it probably never will be dated. Electra is unusual in that it has three forms; in addition to the basic roman, it has italic and cursive. The italic is actually an oblique roman, designed for pleasant reading in larger masses, while the cursive offers the more decorative design of Manutius' versions. Electra and Electra Bold, with its italic, cursive, and small capitals, ranges from 6 through 14 point.

Eldorado is another Dwiggins face. Its good color makes it excellent for all forms of printing and its compact form gives excellent word count. Letter forms are variants on familiar themes to create pleasant reading and the decorative form of the italic adds grace to the page. Its range, in 1-point steps, is 6 through 12.

Fairfield was the first type designed by Ruzicka, like Dwiggins a noted artist before Linotype lured him into the type-designing field. It is interesting to note that Fairfield Medium is not a weighted version of the original Fairfield but a completely redesigned font. The proportion between caps and lower-case letters is an interesting touch.

Ruzicka designed Primer for use where readability must be maintained along with a high word count. Clarity of design and freedom from frills, combined with dignity, create a face ideally suited not only for textbooks but for legal work, mail order and catalogue composition, and a variety of advertising typography. Primer's sizes run from 6 to 12 point.

Janson is a fine example of combining the grace of a traditional face with the economy of mechanical typesetting. Anton Janson cut this face some time between 1660 and 1687 in Leipzig. His original matrices, now owned by the Stempel type foundry in Frankfurt-am-Main, were used to cast the characters that were used as the basis for Linotype's recutting. A true old style roman, it is as popular in its twentieth century version as it was when it first swept the European printing world. Janson is cut in six sizes, 8 through 14 point.

Monticello is truly an American classic. First cast in 1796 by Binny & Ronaldson of Philadelphia, it has an unobtrusive dignity that makes it usable for almost any kind of printed work. It has high readability and its graceful design elements make it pleasurable to read. Its range starts at 7 point and continues through 14.

SLUG COMPOSING AND CASTING

Linotype and Intertype. This method of composing is a mechanical process invented by Ottmar Mergenthaler. The type is cast as one line or slug at a time. The Linotype or Intertype, handled by an operator, assembles a line of characters to form words, casts the line and distributes the matrices for resetting. The machine handles all of these operations

at one time. The machine has one or more keyboards, connected with one or more inclined receptacles called magazines. Each magazine contains a complete set of matrices of each character and numeral, standard and uniform in size, in a specific type family. To change style or size necessitates merely the change of a magazine. However, these machines are devised to hold more than one magazine at a time.

The matrix or mold from which each letter is cast in a line is made of brass, and varies in thickness according to the style and width of the letter. The edge of the matrix is a die from which the letter is cast.

The machine keyboard corresponds to the arrangement of the magazine containing the matrices. When a key on the board is touched, a corresponding matrix is released from the magazine and caught by a traveling belt. Each succeeding matrix is carried to the assembling elevator to form the line, spaced by extensible wedge-shaped spacers to fill the line as specified. Molten metal is forced into the mold and against the matrices to cast the line. After the line of type is trimmed to proper thickness and type height, it passes on to the receiving galley. After the line is cast, the matrices are automatically released and returned to their respective channels in the magazine. (See Figs. 3–4 and 3–5.)

Machine composing is a fast method of setting type for two important reasons. First, because the operator can work the machine as quickly as the fastest typist operates a typewriter and, secondly, because of the ease with which each line or slug is handled.

Composing by machine provides countless type faces and styles, ranging from 5 point to 36 point in size. Linotype or machine setting is used widely wherever large blocks of copy are specified, such as in newspapers, most books, and some job work.

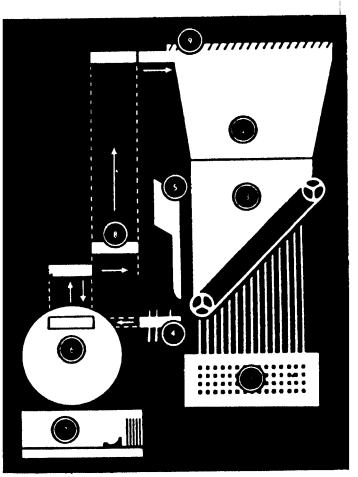


Fig. 3–4. Linotype, Intertype mechanism.
1. Keyboard.
2. Magazine.
3. Delivery channels.
4. Assembling elevator.
5. Spaceband box.
6. Casting mechanism.
7. Galley.
8. Distributing elevator.
9. Distributor.

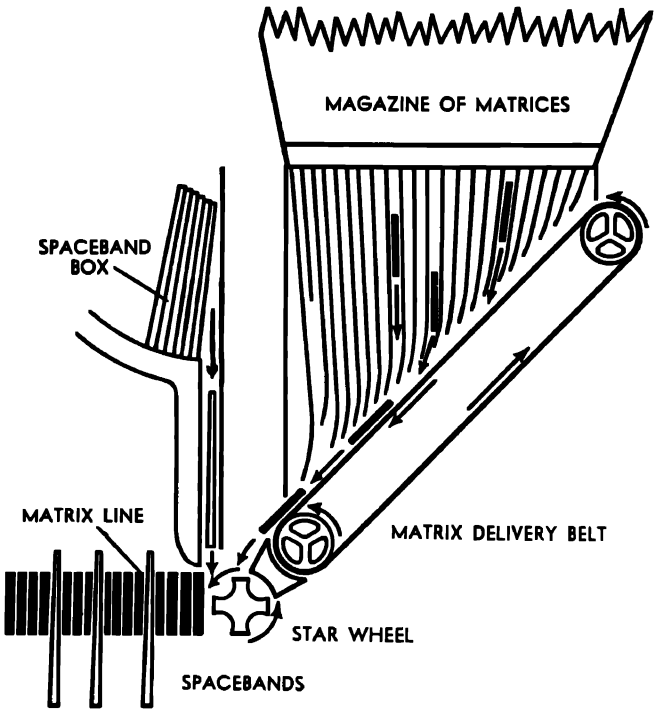
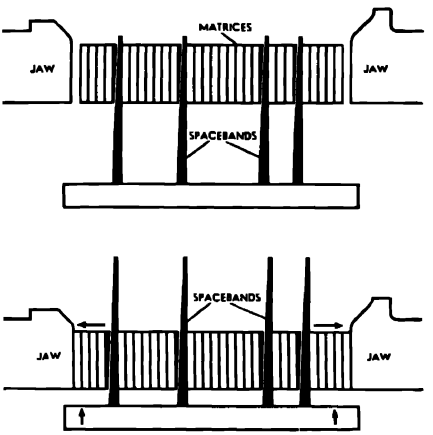
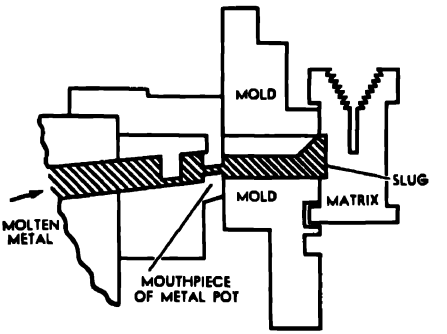


Fig. 3–5. Details of linotype, intertype mechanism (numbers are keyed to Fig. 3–4). The released matrices slide down channels (3) onto delivery belt which carries them to visible elevator (4); the relative distances between the matrix channels and the delivery belt are such that the matrices reach the assembling elevator in the same order in which the keyboard keys are depressed. The matrix line in the lower left corner of the illustration is in the assembling elevator, which is situated on the machine at the point where the delivery lines of matrices and spacebands converge, the spacebands dropping down from above the feeding end of the matrix line. Spacebands (*left*) which can be used with any type face or size are stored in a box (5) above the assembling elevator. As each matrix word group is assembled, the operator depresses the spaceband key. Each time the key is depressed, a spaceband is released and drops into the assembling elevator (4). Spacebands serve two basic purposes: (a) They separate the groups of matrices that form the words. (b) They justify (spread out) the lines to the length for which the vise jaws are set. A spaceband consists of a short sleeve and a long wedge, the inner surfaces of which are tapered. Spacebands are so constructed that when the long wedges are driven upward during justification, the matrix line is spread out until the space between the vise jaws is filled. Spacebands take up a slack of one to three ems, depending on the length of the assembled line. Although the spacebands and matrices are dropped into place in the assembling elevator, actual justification takes place when the line is at casting position at the mold wheel. There, a rod from underneath presses the spacebands upward between words until the line is firmly spaced.

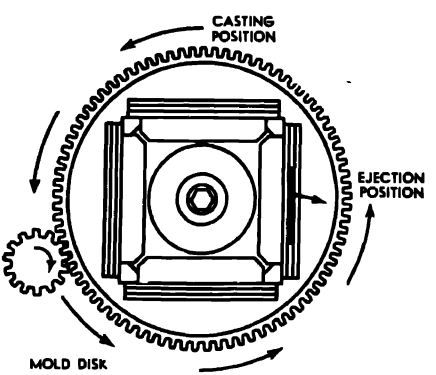
(*Top, page 73.*) When the operator has assembled the line of matrices and spacebands, he raises it to the delivery slide. The slide carries the line to the left, to the casting mechanism (6 and above) and then returns to its normal position, ready to receive the

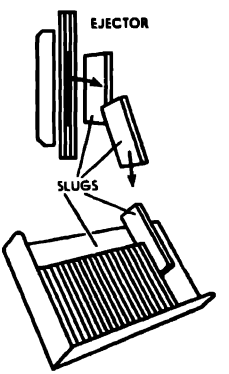




next assembled line. The line of matrices and spacebands is carried to position in front of the mold (6). The matrices are positioned so that their punched characters align with the front opening of the mold. The back of the mold aligns with the mouthpiece of the metal pot, which is filled with molten type metal. In preparation for the casting of the slug, the line of matrices is justified or spread out to the length provided between the vise jaws. The matrices are then aligned vertically and face-wise in relation to the mold. The metal pot containing the molten lead is situated behind the mold wheel and is heated by electricity or gas. The metal pot now locks against the back of the mold and the pot pump plunger forces molten type metal forward into the mold cavity. The metal thereby forms a solid slug, bearing a line of type reproduced from the punched characters of the matrices. The slugs are printed from directly, or are locked up with original engravings for the molding of electrotypes. After use, slugs are melted down.

(*Below, left.*) The mold then turns the slug from the casting to the ejecting position. Before the slug is ejected its base is trimmed to type height. While the slug is being ejected, two parallel knives trim it to the correct thickness. The more accurate the trimming, the less the likelihood of work-ups when printing. (*Below, right.*) Then the slug slides into the galley (7) at the front of the machine. Each successive slug is stacked to the right of the preceding ones in regular column formation. The whole casting operation is automatic, with seven lines being cast each minute. In case of a typographical error, the entire line can be quickly reset and recast, and inserted manually in the proper place in the galley or form.





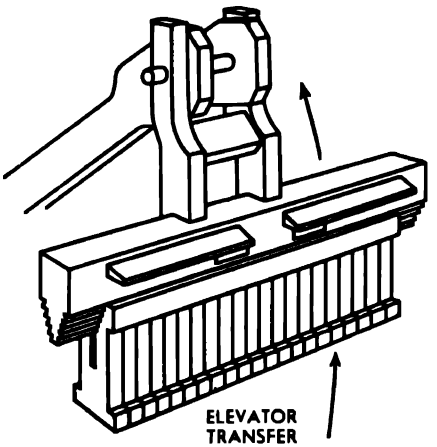
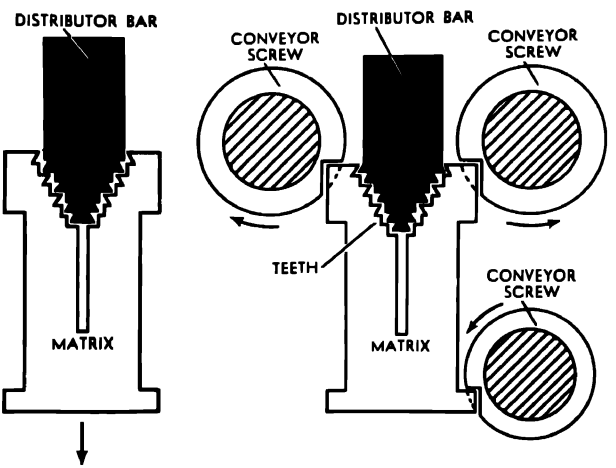


Fig. 3–5 (*Continued*). While the slug is being trimmed and ejected, the matrices and spacebands from which the slug was cast are being returned to their point of origin. The line is raised to the transfer channel, at which point the matrices are transferred to the second, or distributing, elevator (8). While the second elevator is raising the matrices to the distributing mechanism at the top of the machine, the spacebands are returned to their box (5). The second elevator consists of a series of notches or steps that are the counterpart of the teeth on the upper part of the matrices. The elevator slides into the line of matrices from the end of the line and by dovetailing with the teeth of the matrices, grips the matrices, and raises them up. (*Below*) A mechanical arm pushes the matrices one by one into the distributor, which is above the magazine. The matrices are supported by their teeth on the distributor bar, in which various combinations of teeth are cut. They are moved along the bar by three revolving screws (*below, right*) which engage the projecting matrix lugs. When the matrix reaches a point directly over its channel in the magazine, there is a gap in the teeth of the distributor bar corresponding to the combination of teeth cut in the matrix (*below, left*). The matrix, thus released, drops into its channel entrance, then slides back down into its correct channel in the magazine.



Keyboards. The Intertype and Linotype machine keyboards are similar in principle. Both machines compose and cast lines or slugs of type. The keyboards of both are or can be designed to incorporate special keyboards for all kinds of head or initial letters, large advertising figures,

foreign languages, and special composition. The machines utilize this keyboard arrangement to mix any of the above characters with those from regular magazines. Other features can be built into the machines to meet special composition problems.

When a job requires machine setting, and copy specifications indicate emphasis of certain words by a change of style or size, prominence of a price within the copy, or inclusion of foreign words with accents, the interchangeable feature of the machine is of great value. The machine can set type in measures or width of line from 4 picas to 30 picas in width and in sizes ranging from 5-point type to 36-point type.

Monotype. The Monotype method of typesetting is also a mechanical process. Invented by Talbert Lanston, the Monotype machine casts type one character at a time, and composes it by lines. The machine consists of two separate units controlled by compressed air; one is a perforation machine with a keyboard and the other is a casting machine. The keyboard unit contains 276 keys with complete characters or fonts of capital and lower-case letters, small caps, boldface letters, spaces, points, and italic letters. The keys are not changed for different classes of work, but the keyboard mechanism can be changed and converted to meet the requirements of special composition. In operation, 4-inch ribbon is perforated with each stroke of the key. This ribbon matrix contains the proper characters for casting. Space and length of the line are also predetermined by the keys that are struck. The casting of the type is done from the perforated spool of paper. Once cast, the metal is instantly chilled and ejected into a galley. The type line is then automatically advanced to make way for the lines of type which follow a moment later.

Monotype faces of type include sizes from 5 point to 18 point. They also include display type faces ranging to 60 point. Leads, borders, quads, initial letters, and other characters for general uses are set from individual matrices.

The Monotype method of typesetting is used to advantage for many and varied purposes, including certain types of tabular and chart work, book work, magazines, and catalogs.

Ludlow. The Ludlow method of typesetting is a combination of hand setting and machine casting. Ludlow offers display type sizes ranging from 8 point to 72 point in an unlimited assortment of popular styles. Headlines, especially for newspapers and magazines, utilize Ludlow because this system of typesetting provides an unlimited supply of type characters. It is also a fast method because little time is lost in redistributing type from dead forms or picking it up from standing or locked-up forms. The

Ludlow method insures a clean, sharp reproduction because it provides new type for every job.

Various sizes and styles of matrices are arranged in cabinets for the convenience of the typographers. Any size line can be set in a special stick. Matrices are assembled by hand into the stick and the line is tightened by a thumbscrew and locked into position. They are then set into a casting machine, and within a few seconds a line is cast. As many castings or duplicate lines can be made as are required. At the completion of the casting, the matrices are returned to the cabinet, ready for a new line setup. After the casting is used for printing, the metal is remelted and can be used for new Ludlow work. (See Appendix V, pp. 333–344, for examples of Ludlow type.)

THE POINT SYSTEM

All type has a body and a face, and the height from the foot to the face is .918 inches. This measurement is always constant. The height of the top side or face of the type is measured in points. A point is equal to $\frac{1}{72}$ inch. A 1-inch letter is therefore 72 points, and $\frac{1}{2}$-inch letter would be 36-point type. It is wise to note that each type face or type family is different in design and character. Some faces have longer descenders or ascenders than others; some are fatter or more extended than others; some are bolder and some are more condensed than others. Regardless of these facts, size takes in the height of the letter from the ascender to the descender, thereby determining the point size. For example, look at Caslon 471,540 (pages 278–279). In Caslon 540, the heart of the letter is heavier, longer, and wider than in Caslon 471. The ascenders and descenders in Caslon 471 are longer, but the measurement from one extremity to another takes in no more height than 72 points for a 1-inch letter. As another example (284–350 and 352), Goudy and Nicolas Cochin vary in appearance of height, but only the heart of the letter in Nicolas Cochin is smaller, with longer ascenders and descenders than Goudy.

Some faces are wider in design and occasionally blacker or bolder, thereby varying widths of lines set with the same number of characters, e.g., Caslon 471 and New Caslon. (See illustration, pages 278–279 and 280.)

Note that 36-point New Caslon sets wider in measurement than Caslon 471 of equal point size with the same number of characters.

Spacing. Type can be spaced in three ways: between letters, between words, or between lines.

The reasons for letter or word spacing are usually determined by the width of the line specified and by the legibility and readability of the line. In foundry type or hand setting, spacing is done with spaces or blank type which, of course, will not print. The largest space or blank

type is known as an em quad, which is a square of the point size of the type; the next spacer is known as an en quad, which is one half the size of an em quad in width but still retains the point size in height. The space continues to grow narrower for different purposes of spacing; the 3-em space is equivalent to one third of an em quad; the 4-em space is equivalent to one fourth the size of an em quad; and the 5-em space is equivalent to one fifth the size of an em quad. Hairline spaces are one sixth of an em or thinner.

In Linotype or Intertype methods of setting type, word spacing is done with wedgelike spacebands which are dropped into the line of the matrices. Just before the line is full, the operator pulls a lever, causing upward pressure on the spacebands to squeeze the line out to its full width as specified, making all the spaces between words the same size.

In Monotype setting, the bell, similar to a typewriter bell, signals the Monotype operator near the end of a line. He may either finish the line or hyphenate it, at his discretion. The Monotype machine automatically adds up the width of the letters in the line and indicates the remaining space that is available to fill the line. The last key struck by the Monotype operator establishes the width of all spaces in the line.

Letter Spacing. In spacing letters to provide readability and design, several rules are helpful:

1. Space between lower-case letters is not desirable.

Lower-case letters need no spacing.

L o w e r - c a s e l e t t e r s n e e d n o s p a c

2. For a line set in capitals or caps and small caps, moderate letter spacing usually improves the readability of the line.

MODERATE LETTER SPACING AIDS READAB
M O D E R A T E L E T T E R S P A C I N G A I D S R E
M O D E R A T E L E T T E R S P A C I N G

3. Too much space in between characters decreases legibility.

EXCESSIVE LETTERSPACING DECREASES READABIL
E X C E S S I V E L E T T E R S P acing d

Legibility can also be achieved by avoiding the use of all caps in a line and the use of upper-case letters in blocks of copy. Lower-case letters are more easily read than capitals.

All-cap lines and lines with many capital
letters are harder to read than lower case.

ALL-CAP LINES AND LINES WITH
MANY CAPITAL LETTERS ARE H

All-Cap Lines And Lines With Many Ca
pital Letters Are Harder To Read Tha

Line Spacing. Several major rules govern good line spacing:

1. If the space between words is approximately equaled by the space between lines, legibility is improved.

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

2. Type faces with short ascenders and descenders require less space between lines.

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow

3. Large size lower-case letters need more spacing between lines.

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in

Leading. Spacing between lines differs from letter spacing in terminology and method. It is called leading and is done with leads or slugs which are less than type-high. Leads vary in thickness from 1 point to 5 points. When the space between lines or paragraphs is specified from 6 points to 12 points, the spacers are known as slugs. Combinations of leads and slugs are often used to meet requirements.

The following table is an aid in line spacing:

Type Size	Minimum Leading	Maximum Leading
6 point	solid	1 point
8 point	solid	2 point
10 point	solid to 2 point	4 point
11 point	1 point	4 point
12 point	2 point	6 point
14 point	3 point	8 point

Paragraph Spacing. The purpose of paragraph spacing is to give the reader a fresh start in long reading matter at intervals, and to break up the monotony of solid reading by periodically reawakening reader interest. The correct amount of space between paragraphs can usually be determined by the line leading. A fairly safe rule is to increase the line leading from 2 points to 4 points.

Indented paragraphs are preferable to flush paragraphs, and are accepted for easier reading by all book and newspaper typographers.

Initial letters also make for easy reading. They break the monotony of text matter, help maintain reader interest, and add to the decorative spirit of the thought. They should always be aligned with the lines of the text. Stick-up initials should be in line with the bottom of the first line. Harmony of space must be considered with such undercut initials as T, W, V, F, or P which, of course, should harmonize with the type matter that follows. Swash letters should be used with great care to be effective in display and legibility.

Readability and Selection of Type. The proper selection of type is an integral part of conveying a particular thought, expression, or idea, keeping foremost in mind that legibility and readability are of utmost importance. The overwhelming proportion of type faces in current use—old style or modern—are designed to be read with ease, compared to many of the ornate and highly intricate designs of yesteryear. However, the type selected to convey any given message must be immediately accepted by an entire audience of consumers or other readers. In addition, type must harmonize with the over-all concept of the layout, art work, idea, or product, as well as achieve unity with the paper on which it is printed.

There are a great variety of type faces, which, because of their light or heavy designs, connote either femininity or masculinity. Obviously, type in advertisements for home permanents or foundation garments should be chosen from one of the type family usually associated with our ideal of the thin shapely female—Futura, Bodoni, Lydian, etc. On the other hand, the advertiser of masculine products, such as trucks and power tools would be wise to select type faces such as Gooper black, Stymie extra bold, Futura display, or Franklin Gothic, to express such qualities as strength, boldness, and weight.

In cases where the gender or appeal of the product is less extreme and obvious, the choice of a type face is more difficult. It requires a penetrating analysis of both the product and the consumer. Only after this analysis is made, can the choice of type speak in the name of the product.

Still another consideration in the selection of type is the harmony it

must achieve with the art work. Delicate line drawings obviously preclude the selection of thick, bold letters, regardless of their legibility. Likewise, an ethereal, flowing script would do a grave injustice to a strong, massive illustration.

TYPE CLASSIFICATION AND SELECTION

Although there are hundreds of different type faces and families of type, all are grouped under one of five classifications, each of which is identifiable by certain distinct characteristics. These characteristics help to determine the use of type faces in combination with one another, and also provide a basis for the understanding and knowledge of the use of type generally.

The five classifications are known as (1) modern, (2) old style, (3) sans serif, (4) script, and (5) Venetian.

1. Modern. The modern styles are used extensively today. They are popular for display reading matter, and are most readable in text matter when set in the right measure and properly leaded. Bodoni is an excellent example of a modern type face. The contrast between light and heavy strokes is a factor which may vary in different types within this classification, but the distinct, thin, straight, clean-cut serif is always prominent and pronounced in this group. The lower-case letters, such as b, d, h, i, l, m, n, and p, offer true examples of this outstanding characteristic.

2. Old Style. The wedge-shaped serif and the graceful curve from the body of the letter to the serif, as in Caslon, distinguishes old style from modern. This characteristic is more pronounced in the lower-case letters than in the capitals. Frequently old style and modern faces are combined to produce effective design and feeling. Many experts in typography, however, consider the combination unorthodox.

3. Sans Serif. The creation of sans-serif type faces was largely the result of demands for modernism in elementary type forms. As the name implies, this type is without serifs and is easily identified. The evenness of each stroke of the letter, as in Futura, makes it adaptable to combinations using other monotone units of either type matter or illustration. In text matter, however, it is wise to set sans-serif type faces in short paragraph form with plenty of lead between the lines.

4. Script. Script affords a continuity in reading matter which is unequaled by any other type style. The finishing stroke of each letter is picked up by the opening stroke of the next letter, and should never be broken by letter spacing. Script is popular for advertising of a delicate nature, where it adds a dignity, balance, and freshness which could not

be achieved by any other type face. Typical of the script type group is Bernhard Cursive, which can be combined effectively with either modern or old style. Care and discretion must be exercised in handling script, so that overblending and monotony do not prevail.

5. Venetian. A slight curvature at the bottom of the descending serif is a distinguishing characteristic of Venetian old style. All the strokes of the letter are nearly equal in weight, and the general formation of the letters produces a monotone effect.

Venetian old style is never combined with modern types. The pleasing tonal effect of its combination with old styles, such as Garamond, Cloister, Piranesi, Nicolas Cochin, and Lutetia, is evident in fine book work and in advertising of distinction.

TEXT AND DISPLAY TYPE COMBINATIONS

There are two general uses to which type is put: text and display. Text type is the type we read in the body of a story, an advertisement, a book, or any printed treatise. It generally ranges in size from 5 point to 12 point, with intermediate sizes including 6, 7, 8, 9, 10, and 11.

Display type is headline, caption, or signature type. It is type that is used for attention-getting words, phrases, sentences, or brief messages, whether they appear in an advertising message, a newspaper, book, folder, or brochure—in fact, in anything that is printed today. Display type usually comprises the first words the reader sees, the thought-conveying essence of the printed message. Display type begins at 14 point and goes all the way up to 72 point and sometimes larger.

Combining the appropriate display type and text type is a task that typographers and production men are most frequently called upon to do. In many cases, the display type is in the same family as the body or text type. In others, a combination of display type and text type is used.

Before attempting to combine faces, it is wise for the beginner to familiarize himself with some of the accepted combinations. The compilation that is offered, not as a final or definitive series of type combinations, but as one that will indicate certain standard combinations as well as other suggested ones that may be helpful.

In this connection, a most valuable device has been developed, the Type Visualizer, which, at a cost within the schoolbook budget of any student, enables him to visualize some 144,000 combinations of text and display faces.

All text type in the examples is set in 10-point size and leaded 2 points. Display lines were set up and line engravings made from reproduction proofs. The type combinations appear in Appendix VI on pages 345–359.

Similar Type-face Groupings. On pages 361–364, Appendix VII, are one-line showings of type faces grouped according to similarity of appearance or characteristics. This grouping will help the production man make substitutions of one face for another when necessary. These showings are taken from the Graphic Arts Production Yearbook, regarded by many as the "production man's Bible."

Copy Fitting. Copy fitting is regarded by many as difficult and intricate, and this is usually true because of lack of "know how" and understanding. Certain basic information, simply presented, can establish confidence in fitting any copy. Rules and regulations of copy fitting are based on formulas of common sense. The simplest formula we know is that one plus one equals two. From here on, copy fitting should be a simple operation.

First and foremost, in calculating type fitting, words are meaningless. Characters count, and only characters are counted in fitting copy. Moreover, the spaces between words are counted as characters.

Charts which show the number of characters that will fit in a width of 6 picas or 1 inch are available for practically every type face and type size. A most complete and easy-to-use chart of this kind is in Table I, pages 224–248.

Usually copy is typewritten in either elite type, which provides 12 characters to the inch, or pica type, which has 10 characters to the inch. Thus, elite typewritten copy with 10 lines of the average 6-inch width will contain 720 characters. If 10-point Bodoni, set 18 picas wide, is the type to be used, the number of lines can be determined by dividing 720 characters by 45, which will give a total of 16 lines in depth. Each point size of type from 4 point to 72 point contains a definite number of lines to the inch (see chart). You will find that 10 point will contain 7 lines plus a fraction of a line to the inch. Therefore, 24 lines of the specified copy will take up approximately 3½ inches in depth. This method of counting has been found to be simple, direct, and foolproof.

Point Size	Lines per Inch	Point Size	Lines per Inch
4 point	18 lines	8 point	9 lines
5 point	14 lines plus	9 point	8 lines
6 point	12 lines	10 point	7 lines plus
12 point	6 lines	30 point	2⅔ lines
14 point	5 lines plus	36 point	2 lines
18 point	4 lines	48 point	1½ lines
24 point	3 lines	72 point	1 line

Type Reproduction Proofs. Regardless of the printing process used—letterpress, offset lithography, gravure—a type proof can be considered

as a piece of art copy. The reason for this is that it must photograph for either a line plate or a line negative. Good reproduction in either of the above-mentioned processes requires that the type proof be sharp, clean, and opaque black.

When type is set with the intention of reproducing directly from it, great care should be taken to assure its cleanliness and freedom from random specks of dust. Sometimes the smallest particle of dust shows up on the proof, defacing the intended effect. Ink, which has a tendency to spread on even the best paper obtainable, should be used discriminately to avoid overinking, which may result in the distortion of the character and design of the type. In every instance, the consistency of the ink should be cautiously controlled and, to insure the best possible reproduction, should be absolutely opaque black. Since smudging is always a great danger, the ink should be allowed to dry before handling, whenever possible.

In all cases, the requirements of true reproduction dictate that the type form should be locked squarely and tightly. String is a poor binder for type because it does not assure the proper permanent lock. Of course, make-ready should not be hurried, because the proper impression depends on this procedure. To obtain a truly sharp, clean negative from the photography of the type proof, papers that are transparent, dull, highly coated, uncoated, or contain a bluish cast may be used.

Proofreaders' Marks. To achieve a universal understanding among editors, copywriters, proofreaders, or printers, proofreaders' marks have been standardized for all concerned. They should be clearly written in the margin of the copy. Obviously, carelessness or sloppiness in correcting proofs can be both expensive and time consuming. Any misunderstanding of the proofreaders' marks may cause unwarranted delay and the additional expenditure of resetting.

Proofreaders' marks should be a familiar workaday tool for virtually everybody concerned with the communication arts. These symbols, standard throughout the industry, are listed in Figure 3–6, pages 84–85.

TEN TYPE TIPS

1. Typewrite copy, double-spaced, on one side of uniform sheets of paper, preferably 8½ × 11 inches.
2. Allow sufficient margin to permit the writing of instructions.
3. If clippings or like matter are used with the copy, paste them firmly on the standard sheets.
4. Number all pages consecutively; mark "30" or "the end" on the last sheet.
5. Be sure the copy will fit into the allotted area, as regards the size of type used, including leading.

Fig. 3–6. Proofreaders' Marks.

Mark	Explanation	Example
	Take out character indicated.	 The proof.
	Left out, insert.	The proof.
	Insert space.	 Theproof.
	Turn inverted letter.	 The proof.
	Broken letter.	 The proof.
	Push down space.	 The proof.
	Even space.	 A good proof.
	Less space.	 The proof.
	Close up; no space.	 The proof.
	Transpose.	 A proof good.
	Wrong font.	 The proof.
	Lower case.	 The Proof.
	Small capitals.	 The proof. The proof.
	Capitals and small capitals.	 The proof. The proof
	Capitals.	The proof. The proof.
	Capitalize.	 The proof.
	Italic.	 The proof. The proof.
	Roman.	 The proof.
	Bold face.	 The proof. The proof.
	Let it stand.	 ~~The~~ proof. ~~The~~ proof.
	Out, see copy.	 He proof.
	Spell out.	 King Geo
	Start paragraph.	 read. The
	No paragraph; run-in.	 marked. Three men.
	Raise.	 The proof!
	Lower.	 The proof.
	Move left.	 The proof.
	Move right.	 The proof.

Fig. 3–6 (*Continued*).

Mark	Explanation	Example
	Align type.	 Three men. Two women.
	Straighten line.	 The proof.
	Insert period.	 The proof
	Insert comma	 The proof
	Insert colon.	The proof
	Insert semicolon.	 The proof
	Insert apostrophe.	 The boys proof.
	Insert quotation marks.	 Marked it proof.
	Insert hyphen.	 A proofmark.
	Insert inferior figure.	 Water, H_2O
	Insert superior figure.	 $A^2+B^2=C^2$
	Insert exclamation mark.	 Prove it
	Insert question mark.	 Is it good
	Query for author.	 The proof read by
	Insert brackets.	The Jones boy
	Insert parentheses.	 The proof.
	Insert 1-en dash.	The proof
	Insert 1-em dash.	 The proof
	Insert 2-em dash.	 The proof
	Indent 1-em.	 The proof.
	Indent 2-ems.	 The proof.
	Indent 3-ems.	 The proof.
	Insert lead between lines.	 The proof was read by Jones.
	Insert hair space	 The proof was read by Jones.
	Delete and close up.	The boys proof was read by Jones.
	Is this right?	 The proof was not read by Jones.

6. Check the copy carefully for style, punctuation, spelling, capitalization, and figures such as dates, amounts of money, and statistics.

7. Furnish all proofs of copy, plates, or layout before having type set.

8. Always give complete instructions, specifying type face, point size, measure in picas, date, and number of proofs desired.

9. Set a delivery date which allows the printer ample time to do a good job and to save time and money by avoiding alterations.

10. Always consult the printer, especially when in doubt. Always specify the kind of paper stock to be used; this will enable the printer to help you select the most effective type face.

Electrotyping or Duplicating Type Forms. When ganging-up, or printing many impressions of the same type setup, duplicate electrotypes are made for economy and speed. For good quality electrotypes, the compositor is careful to use new type specially designed for the purpose of duplicating, which is always locked up in a special chase. Large pages of type matter are duplicated separately, but smaller pages are duplicated together with sufficient space between each page for sawing apart and for margins.

Borders. Borders are primarily employed as an embellishment for the printed word. Material for borders varies considerably in artistic merit and mechanical limitations; a successful choice depends largely on a feeling for design and color and on careful planning and measurement.

Plain, single-line rules, made of type metal cut from precast strips or cast specifically, are available in any desired length. In ordering these rules, points or picas may be specified. Better than type alloy for ruggedness are brass rules, which come equipped with special single-piece corners on which the design is carried in continuous metal. Parallel rules of different point sizes are called Oxford rules. Three or more of these of the same or different sizes cast on a single body are known as multiple rules. If made-up patterns are not available, both Oxford and multiple rules can be made of separate units with the necessary leading between them.

Ornaments suitable for borders come in two forms: those in foundry type or mats of individual units for Ludlow, Monotype, and slug-casting machine composition; and matrix slides for slug-casting machines. These slides are brass matrices in strip form from which slugs for borders may be cast in any desired measure in one operation.

There is also a wide range of decorative material distinctly allied with specific type faces and families. For example, Caslon ornaments are derived from sources older than the face and are unsurpassed in fitness and charm; Bodoni ornaments are based on Pompeian decorations and re-

flect and harmonize with the Bodoni motif. The same principles that govern the mixing of two or more type faces in a single design control type and ornament combinations. The texture, typographic quality, color, design, and distribution of stems and hairlines in ornaments should reflect the characteristic aspects of the type chosen for the copy.

Character-per-pica Copy-fitting Tables. The most accurate, complete, and easy-to-use copy-fitting tables in existence are shown in Table I, pages 224–248. For greatest accuracy, text should be fitted paragraph by paragraph. For best readability, line length should contain about 40 characters.

To visualize whether the selected face is relatively wide or narrow, compare the character count with the figures at the head of the columns. To select a different type face that is wider or narrower, simply scan the column for the size desired. Since all character counts are listed in columns by sizes, the fit of all faces of any one size can be easily compared. The higher the character-per-pica count, the more characters will fit in a given space.

SOME NEW DEVELOPMENTS

Among the most interesting and important typographic trends during the past few years have been the increased use of the typewriter as a composing machine and the development of typesetting machines that employ a camera and film in place of the caster and metal.

Varityper. The Varitype machine, a compact, electric composing machine used a great deal in offices, quickly and economically prepares master copy and stencils for all methods of duplication. The machine resembles a typewriter, works on a standard keyboard, and can be operated, after some instruction, by any competent typist.

With the Varityper it is possible to type in over 600 different type styles and sizes, with flexible spacing, square margins, and a crisp, clean appearance in the finished work. Each size and style consists of a small metal segment faced with 90 characters. Type can be changed from one font to another in a matter of seconds. After typing, Varitype copy can be run off by offset, duplicating, photostating, or blueprinting. It is suitable for forms, bulletins, booklets, specifications, bills of material, menus, instructions, house organs, sales promotion pieces, price lists, and numerous other jobs.

Fotosetter. Many years and much money have been spent in an attempt to perfect equipment that will photographically transpose typewritten copy into type negatives or positives.

The Fotosetter works on the same principle as the slug-casting ma-

chine. Stored in the magazines of the machines are circulating matrices which carry tooth combinations for distribution back into the magazines. The keyboard operator releases the matrices from the magazine and assembles them in the assembling elevator. In this elevator the matrices form into lines of any length up to 42 picas. As in the slug-casting machine, any corrections the operator deems necessary can be made at this point. The line of type is then delivered to the justifying mechanism, and the matrices in the line are projected and photographed individually on a sensitized paper or film.

The line is now automatically justified to the predetermined length, and specific spaces between lines are also set. After being photographed, the matrices (again functioning like those of the slug caster) are returned to the magazines for reuse.

Each Fotosetter has a keyboard equipped with 114 keys, 24 more than a single-keyboard line-casting machine. The 114 keys are composed of three alphabets and a complete set of figures and points. Also on the keyboard is a signal light, which flashes to warn the operator when the camera is running low on film.

Another device permits the operator to set lines flush left or right. To prevent the camera from photographing a line, the operator simply presses a button, which automatically stops the feeding of the film, as the matrices pass through the camera on the way to the distributor.

Current for two different light intensities is provided by a three-way switch. One intensity is required for exposing the film, the other for exposing the sensitized paper. A light meter indicates the proper light intensity for both the paper and the film, and a constant-voltage transformer regulates current fluctuations.

The Intertype Fotosetter is designed on the letter-by-letter rather than the line-by-line principle and, to prevent the possibility of distortions and to insure accurate reproductions, photographs each letter individually rather than each line as a unit.

Entirely new and revolutionary in design is the Intertype Fotomat. This device carries the master character in the form of a photographic image imbedded in the side of the matrix and secured in position to prevent any injury. During the photographing process each letter is perfectly spaced and aligned, as the machine automatically divides the spacing required for justification of each line between characters as well as between words. Once set, the spaces between lines will be accurately repeated until changed. Variations in the spacing between lines can also be arranged.

Typographers are particularly interested in the full-kerning, close-fitting italic composition of the Fotosetter, and the elimination of un-

appealing spacing which often follows such capitals as W, V, Y, T, L, etc., without the use of a single ligature.

In operation, as each matrix is removed from the assembled line, it is followed up by a rack for the remaining portion of the line. This rack permits the film carriage which holds the sensitized paper or film to drop a distance equal or proportionate to the thickness of the removed matrix. A gear transmission, set between the horizontal rack (which follows the matrix line) and the vertical rack (which permits the film carriage to drop by gravity), controls the relative movements of the film.

The matrices themselves are advanced vertically to the light beam, photographed, and moved along to the distributing position by intermittent motion at a speed much greater than any operator's composing speed. Because up to eight lenses may be mounted on the lens turret and individually positioned with complete accuracy by manipulation of a knob and dial within easy reach of the operator, eight different sizes of type matter may be obtained from one font of matrices; thus, with two fonts of matrices a complete range of sizes, from 4 to 36 points, may be provided. Unorthodox sizes, not used in conventional type composition, can also be created.

The Intertype Fotosetter produces:

1. *Film positives.* Either (a) right-reading positive film for gravure, with the emulsion side toward the cylinder; or (b) wrong-reading (reverse) positive film for deep-etch offset lithography, with the emulsion side toward the plate.

2. *Film negatives.* Either (a) backwards, or wrong-reading negatives on the emulsion side, reading like a type form, for making albumin plates in lithography; or (b) right-reading negatives for making photoengravings, with the emulsion side of the film toward the plate.

3. *Paper positives.* For paste-up work in art and layout, for making negatives with line illustrations, or for stripping-in with halftone illustrations for lithography, letterpress, or gravure.

Hence, any printing plate for letterpress, offset lithography, or gravure can be made by direct emulsion contact from film produced by the Intertype Fotosetter.

Atf-hadego. This machine is a new photoletterer which makes possible the photograph reproduction of display composition, in a wide variety of type styles and sizes. Composition is produced rapidly on film, eliminating the casting and handling of metal and the pulling of proofs. Line length, leading, degree of enlargement or reduction, and movement of film into holder are all automatically controlled. Duplicate lines or repeat

border patterns, and double exposing and shading of letters are easily handled, it is claimed.

Twenty-three styles of well-selected type series are immediately available. Special matrices for setting music, trade-marks, borders, emblems, and stock designs are also available. Photographic images ranging from 4 to 115 points may be obtained with this equipment.

SOME TYPOGRAPHIC TERMS

Following are terms commonly used by printers and buyers of printing when discussing typographic problems.

Agate. (1) Agate is the old name for 5½-point type. (2) It is also the unit of measurement for depths of newspaper advertisements. (Inches are used on weeklies as a rule; agate lines on dailies.)

Agate Line. The agate line is a standard of measurement for depth of columns of advertising space. Fourteen agate lines make one column inch.

Ascending Letters. Those letters which, like l, b, d, and h, occupy the upper three quarters of the type body are called ascending; the rising strokes of such letters are called ascenders.

Block Letter. A letter which is sans serif or Gothic is called a block letter.

Boldface. Boldface type is that which is heavier in face than the text with which it is used; it is also called blackface and fullface.

Brass Rule. This is a strip of rolled brass, type-high, with face finished to print a plain or ornamental line or lines.

Caret. A caret is a proofreader's mark, placed below the line of type to indicate that something has been omitted from the text at that place. The correction is written in the margin of the proof.

Case. A receptacle or "case" is used for the storage of type or other materials of composition, partitioned to keep the contents separated.

Casting off. This is the term used for estimating the amount of space a manuscript will occupy when set in type.

Chase. A heavy metal frame or "chase," rectangular in shape, is used to lock up type and plates for printing.

Composing Room. That part of a printing establishment in which type is set and forms locked up for the press is called the composing room.

Composing Rule. A piece of steel or brass which is part of the composing stick and against which types are placed in setting is called a composing

rule. Usually there is a nib at one end by which it is removed from behind the line after justification is done.

Composing Stick. A hand tool used by compositors to set type in lines, a composing stick can be adjusted to pica and nonpareil measures and derives its name from the early sticks, which were of wood.

Composition. Setting type, either by machine or hand, is called composition.

Condensed Type. Type which is narrower than standard is condensed.

Descenders. The downward strokes of those letters like g, j, p, q, y, are called descenders. They usually make up three fourths of the type body.

Display Type. Types larger than 14 point are called by this name as distinguished from body type.

Dot Leaders. A series of dots or periods designed to guide the reader's eye across otherwise white space can be used effectively in setting tables, statistics, etc. Open leaders contain one dot to the em; close leaders contain two dots to the em.

Expanded Type. A type face whose width is greater than normal is called expanded, and also extended.

Face. (1) The printing surface of a piece of type is termed its face. (2) Also, the term is used for the style of type.

Feet. When a piece of type is cast, a jet of type-metal adheres to the center of the bottom of the type body. This jet is broken off, leaving a rough section. A groove is made through the center to remove this rough section, and this operation leaves the type with two separate sections on which it stands, called feet.

Flush. Type is flush when it is set even with the column rule or margin, or without identation. "Flush and indent" is a direction to the compositor to set the first line of a piece of copy without identation and to indent the succeeding lines at the left..

Font. A complete assortment or font of any one size and style of type contains all the characters—capitals, small capitals, lower-case letters, numerals, punctuation marks, ligatures, etc.—needed for ordinary composition.

Foundry Type. Foundry Type is cast in a commercial type foundry for the trade, as distinguished from type cast in the printing office on type-casting machines.

Furniture. Pieces of wood or metal, less than type-high and very accurately dimensioned, are placed about the type matter in a chase or inserted within the job itself for blanking out large areas.

Galley. A shallow tray is used by compositors to hold type after the lines have been set in the composing stick or on the typesetting machine. It consists, usually, of a thin brass bottom with three perpendicular sides a little more than ½ inch high; the fourth side is open to permit the type, when tied up, to be pushed off on to the imposing stone or elsewhere. The usual full-length galley is about 2 feet long and from 4 to 7 inches wide, but many wider sizes may be obtained. Short, wide galleys of various sizes are used by job compositors for making up book pages and for other special uses.

Galley Proofs. Proofs pulled from type standing in a galley before being made into pages are called galley proofs. The first proof, known as the first galley proof, is rarely seen by the author. It is sent to the proofroom maintained by the printery, where it is corrected and returned to the compositor. When the corrections have been made, the corrected proof on the galley is again inked and new copies of the proof are pulled. This first revised galley proof is again read in the proofroom and marked for typographical correction. It is then stamped "Official Proof" and is sent to the publisher, who in turn forwards it to the author for examination and correction.

Hairline. A hairline may be: (1) the thin line of a character or letter, such as the crossbar of the letter H; (2) a brass or steel rule, type-high, used in printing and named according to its face; or (3) a thin finishing line enclosing the image on an engraved plate.

Inferior Letters. Small letters or figures cast on the lower part of the type face are used mainly in printing mathematical and scientific material.

Initial. The large letter used at the beginning of important paragraphs and sections of a book or other printed matter is an initial.

Italic Swash. This is a type face in hand-tooled version and bold weight.

Italic Type Family. Italic is a letter family of calligraphic form which is inclined to the right from the vertical. The first version was cut from Manutius Aldus and appeared in 1500. It was originally a body type, used for the famous Aldine octavos, but has come to be used for quoted matter or special emphasis in conjunction with the roman letter.

Justifying. Spaces are placed between words of a line of type so as to fill or justify the column measure; also, spacing between lines of paragraphs of a column or page to fill a given space is termed justifying.

Kerned Types. Those types which have a part of the face projecting over the body of the type, like the italic *f*, *j*, *k*, *v*, *w*, etc., are kerned types. In early roman fonts, now known as old style, the top of the letter projected over the body so that when it was used before l or i, as well as when the two were used together, a thin space was needed to prevent the kern from breaking off. To avoid this the f was cast double, also with l and i, on the same type, thus giving the familiar ligatures ff, fl, and fi instead of the ff, fl, and fi as they would appear in single types. Kerned letters are troublesome both to the printer, because the kerns are easily broken, and to the type-founder, because of the extra care and expense in making. Modern type-founders endeavor to avoid kerned letters as much as possible, but they cannot be entirely dispensed with, especially in italic fonts, whose long sloping letters would leave gaps unless the types were made to overhang each other.

Ligature. Two or three letters cast on one body with a connecting stroke, as fi, fl, ff, ffi, ffl, etc., are ligatures.

Light-face Type. Light-face type is that which is lighter in face than the text with which it is used.

Lower Case. The term "lower case" refers to either (1) the part of the type case holding the small letters, figures, points and spaces (usually abbreviated l.c.) or (2) the small letters in a font of type as distinguished from the capital letters.

Low Spaces and Quads. Spaces and quads that are less than type-high are used when the type matter is to be printed from directly and not to be electrotyped.

Masthead. The heading on the editorial page that gives information about the newspaper or periodical is its masthead.

Measure. This is expressed in picas and refers to the width of a line, column, or page of type.

Modern-face Type Family. Modern face is a family of letters characterized by a vertical emphasis and fine-bracketed hair serifs. It is an engraved rather than a calligraphic letter. The first modern face is French and dates from 1702. The chief disadvantage of modern-face type is its inferior legibility in the smaller sizes, because of the weakening of the serifs and the too-great distinction between thick and thin strokes.

Multiple Rules. Parallel type rules, three or more in number, or the same on differing point sizes cast on a single body, are termed "multiple rules."

Old Style. Old style is a type family characterized by lightness of color, comparatively little difference between the thick and thin strokes, and a great amount of oblique emphasis with bracketed serifs.

Pi. This term is used for type which has been disarranged or jumbled. In machine composition, a pi line is a line of type in which the operator has made an error and filled out by striking the keys at random. A form that is "pied" is one in which the lines of type or characters are disarranged or jumbled.

Pica. The printers' unit of measurement is the pica; 1 pica = 12 typographical points; 1 pica = $\frac{1}{6}$ inch.

Plain Initial. An initial consisting of a large roman capital letter is termed a plain initial.

Point. The printers' unit of measuring type height is the point; 1 point is approximately $\frac{1}{72}$ inch (0.013837 of an inch, to be exact).

Quoins (Pronounced Coins). Steel wedge-shaped devices, usually triangular and less than type-high, are used to lock type and plates rigidly in chases for the press.

Raised Initial. An initial is raised when it projects upward from the first line of type, and is sometimes called stick-up initial.

Rule. The term "rule" is used to designate: (1) brass or steel strips, type-high, that print as a line or lines as specified; (2) a stamping die used to make panels, borders, or line fillets; (3) plain line borders used to ornament covers.

Runaround. An irregular margin of type conforming with the shape of an illustration is called a runaround.

Run-in. When one or more sentences are combined in order to avoid making an additional paragraph, they are "run-in."

Script Type Family. Script is any type face, other than italic, cut to resemble contemporary informal handwriting. The earlier script types were Gothic, but these were superseded by Latin scripts, resembling current handwriting. This family of face is popular once more, and contemporary scripts are extensively used in the setting of advertisements.

Sans Serif. Sans serif is a family of type characterized by the absence of a serif; it is a modern type face.

Serifs. A hair line or serif is a light line or stroke crossing or projecting from the end of a main line or stroke in a letter, as at the top and bottom of the letter H. Gothic letters (H) have no serifs and are referred to as

sans serifs, i.e., without serifs. The serifs on straight stems may be slab (heavy or fine), wedge, hair, and they may be bracketed or unbracketed. The bracketing may vary from full to fine. Serifs outside these connotations are known as beaks, as in the arms of L, E, T; and barbs or cat's ears, as in C, G, S. Excrescences on the upper edge of the straight stem of G, and on the upper edge of the arms of T, are known as spurs.

Set Solid. Type composed without leads between the lines is set solid.

Space out. Lines are spaced out when spaces are inserted between words or letters in order to make the line of type cover a specified measure.

Square Serif. This is a character of serif, square at the ends, usually of the same thickness as the thin stroke of the letter.

Standing Matter. Composed type which is kept set up from one printing to another in order to save recomposition is called standing matter.

Straight Matter. Regular type composition in ordinary paragraph form, as distinguished from display or matter set in special arrangement, is called straight matter.

Superior Letters. Small letters or figures cast on the upper part of the body to indicate footnotes or root numbers are superior. Superior letters are also used a great deal in the printing of mathematical and scientific material.

Swash Letters. Letters that have ornamental prolongations or embellishments, called Swash letters, are frequently found among italics because the little flourishes fill up the gaps made by the inclination of the letters. The swashes extend beyond the body on which the main part of the character is found.

Three-line Initial. This is an initial letter having a depth equal to three lines of text matter.

Transparent Proof. Transparent proof is made of transparent cellophane or glassine and is used to eliminate an extra photographic operation.

Type Family. The names given to two or more series of types which are variants of one design are termed a type family.

Widow. A widow is a very short line carried over to the top of a newspaper column, magazine, or book page. It is always desirable to have a full-length type line at the top of a column or printed page.

4

DUPLICATE PLATES

In the letterpress process, there are two categories of printing surfaces —originals and duplicate plates.

Originals may be described as type, photoengravings, woodcuts, and hand-cut plates of any nature such as linoleum, metal, or rubber.

As the words imply, duplicate plates are copies of originals. This category includes stereotypes, electrotypes, molded rubber plates, plastic or resin plates, and aluminotypes. Although all deal with letterpress printing, each has its own peculiar advantage for adaptation to any of the great number of printing applications.

When duplicate plates are desired, it is imperative that the photoengraver be notified at the time he receives copy or art work, so that the original plate may be etched deeply and cleanly to achieve the most true duplicate. If corrections in the original are necessary, the photoengraver should receive special instructions so that the duplicate will include the desired improvements.

ELECTROTYPES

Electrotypes are versatile duplicates. They may be blocked, unblocked, curved, or beveled as is necessary. Tenaplate, plastic, lead, or wax may be used as the molding material with a surface of copper or nickel, when desired.

KINDS OF MOLDS

1. Lead-Mold Electro. Excellent for halftones because it gives a good, clear reproduction, the lead-mold electro also achieves good register in color work and often serves as a master plate for making other electros. Initially, the lead-mold costs more than the wax-mold electro, and can only be made from an original engraving or electro pattern which is especially prepared.

2. Tenaplate. In molding electros, Tenaplate is based with a thin aluminum covered by a molding composition, and coated on the surface with graphite. Formed by extrusion, as is a lead mold, it reproduces line cuts, halftones, and type forms.

3. Vinylite Mold. The Vinylite mold is a very new development which is said to achieve excellent halftone results. It may be finished in copper or nickel. Cost is more than the wax mold, but less than the lead mold.

4. Wax-Mold Electro. For reproduction, wax-mold electros of type forms, halftones, line cuts, or process plates, either singly or in combinations, are used. Detail is not as fine as that attained with lead molds. For a wax-mold electro, the original plate is actually molded in wax as a basis for the metal shell which is tinned, then backed with lead. It is usually copper finished.

SURFACE METALS

1. Copper Electro. For ordinary runs on smooth paper or short runs on rough paper, a copper-faced electro is used. It wears more rapidly and is not abrasion-resistant, like nickel, but it is satisfactory for most printing where duplication is required.

2. Nickel Electro. The nickel electro duplicate is preferred for runs up to 250,000 and for those on rougher paper, since nickel shows less deterioration from ink action than does the more delicate copper.

MAKING THE ELECTROTYPE

Of all the materials used in the casting of an electro—wax, lead, Tenaplate, Vinylite—the conventional choices are wax and lead. Wax, though less costly, is not advisable for fine halftone and process-plate reproduction. Vinylite is still new and not available at all plants; Tenaplate is patented and said to accomplish better results with details than does wax. Usually copper is deposited on the mold for an electro. Nickel, steel, or chromium plates the electro surface for long-run jobs.

The making of an electrotype requires two general processes: the molding of the original and the depositing of a metal shell on the mold. These two processes break down into 16 basic steps that take place at the foundry. Figure numbers in the following discussion refer to diagrams on pages 98–101.

Molding of an electrotype involves the following steps:

1. When wax is the molding medium, the form is locked in the chase, with bearers, and placed on the mold, which is mounted on a metal base. The entire unit is called a case. Tenaplate and lead molds are placed on wax-coated cases.

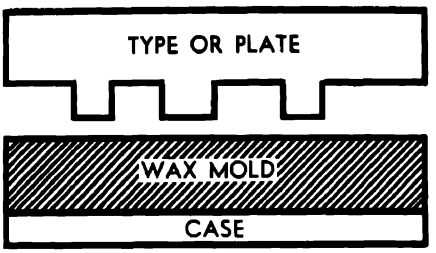


Fig. 4–1. Form and Mold.

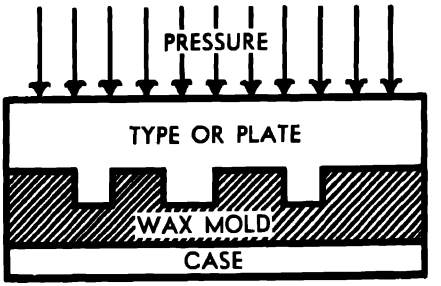


Fig. 4–2. Molding.

2. The type on the form is forced into the wax mold by pressure, and a reverse impression is produced.

3. Excess wax squeezed up in the molding is removed with a sharp, warm knife. To prevent printing of this area, the wax is shaved down to the level of the shoulders of type.

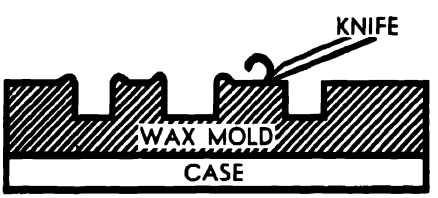


Fig. 4–3. Leveling Mold.

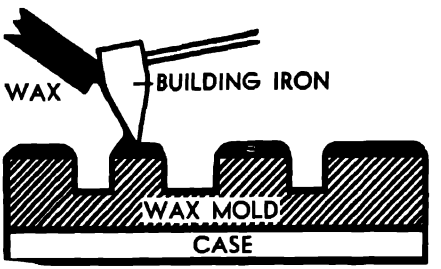


Fig. 4–4. Filling-in.

4. In wax mold, wax is filled into blank or open spaces with a hot, pointed iron. Because the mold is in reverse, these fillings become depressions in the plate and prevent print smudging.

5. To obtain electrical conductivity, a microscopic film of graphite is applied to the wax. It may be sprayed (wet), or brushed (dry). Lead molds do not need this film; plastic molds require a silver spray.

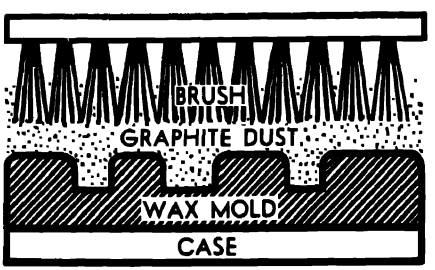


Fig. 4–5. Sensitizing.

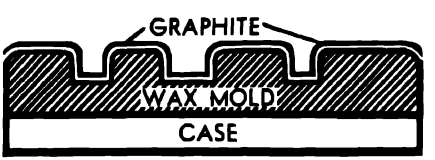


Fig. 4–6. Sensitized Mold.

6. When the graphite layer is even over the surface, the molding is ready to be made.

7. On the wax mold, over the graphited surface, a film of copper is chemically precipitated by a slightly acid solution of copper sulphate. To cause a coat of copper to appear on the face of the mold, iron powder replaces the copper in the solution. This very slight deposit of copper provides a base for speeding up the electro deposition of the copper shell.

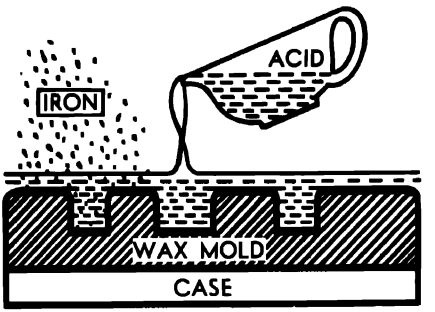


Fig. 4–7. Preliminary Deposition.

8. Electricity enters through anodes, copper sheets, or slabs, passes through the electrotyping solution and exits through cathodes or wax

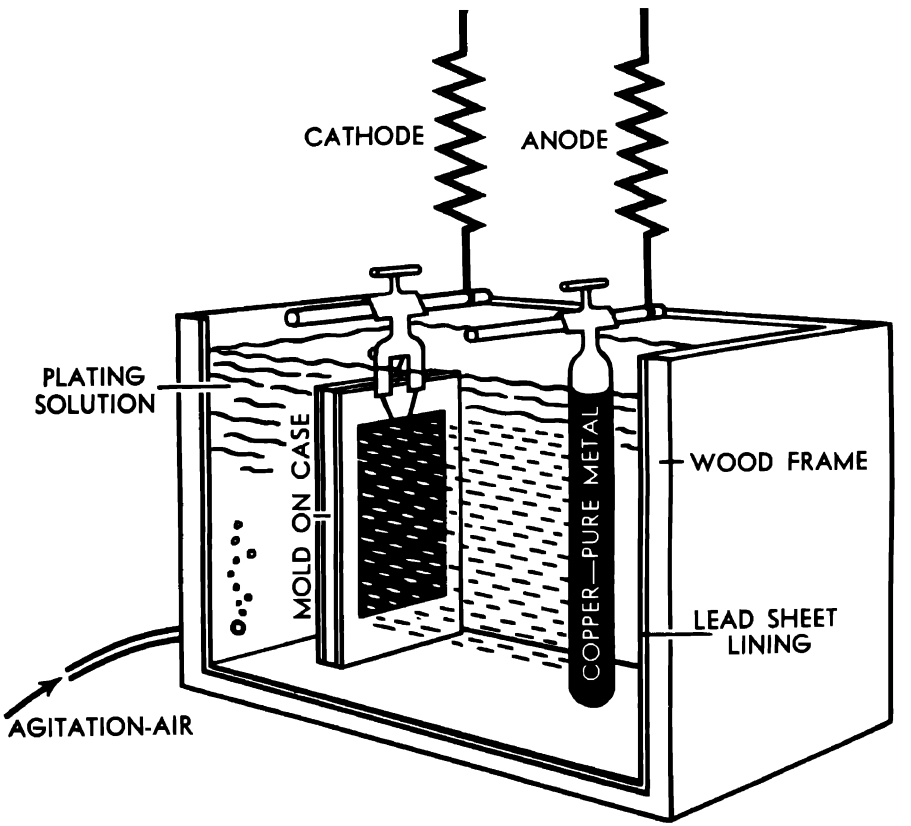


Fig. 4–8. Electro Deposition.

case, leaving a copper deposit on the graphite surface of the wax mold. This same process is followed in Tenaplate molding. In nickeltyping, a solution of nickel salts and a nickel slab or cylinder replace the copper anode. Copper electros will take nickel or chromium plating.

9. Now the copper shell, evenly deposited over the mold, is ready for removal. Carefully applied, the graphite prevents holes in the shell.

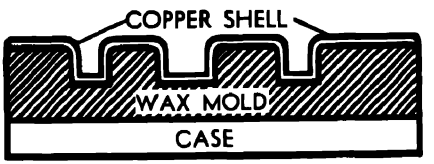


Fig. 4–9. Copper Shell on Mold.

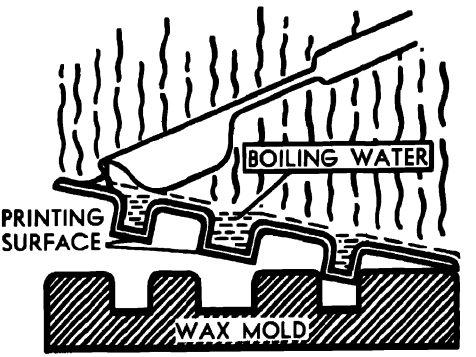


Fig. 4–10. Removing Shell.

10. Boiling water facilitates the release. The wax mold, which has served its purpose, is destroyed, melted, and may be reused. With a nickel shell on lead, the lead is stripped away like tin foil. Tenaplate is treated as is the wax mold. Plastic may be reused.

11. For a perfect bond, the shell back is soldered with tin foil and the electrotype metal added.

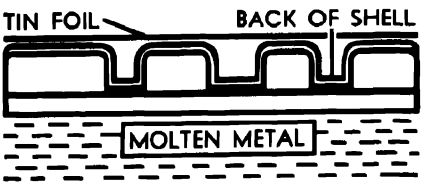


Fig. 4–11. Backing with Foil.

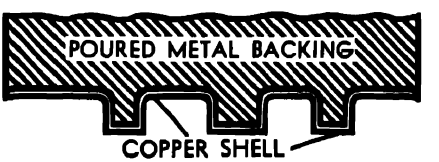


Fig. 4–12. Metal Backing.

12. Molten metal fills in the entire back, giving the plate rigidity and strength and creating a rough back and a thickness of about ¼ inch.

13. The back is smoothed and shaved to about 11 points (.152 inches), the standard thickness for patent-base printing.

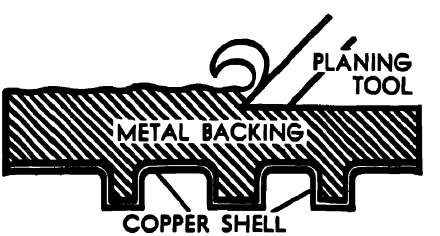


Fig. 4–13. Shaving Down.

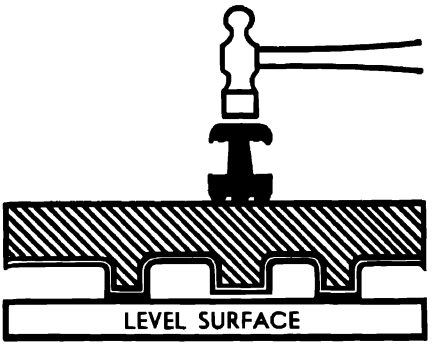


Fig. 4–14. Leveling Plate.

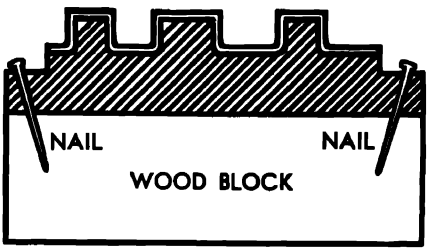


Fig. 4–15. Blocking.

14. Leveling from the back brings the plate surface to a level back, and another shaving results in an accurate thickness. Nonprinting areas are routed to safeguard against smudging during printing.

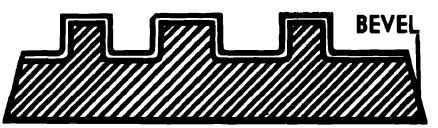


Fig. 4–16. Beveling.

MATS

Mats are paper and composition molds of plates and/or type. They are inexpensive, light in weight, easy to handle, pack, and ship. The advantage of using them is obvious whenever there is a need for shipping a number of duplicates to a list of publications, store advertising departments, dealers, etc. They do not reproduce with the same high quality that can be secured from electros, but for coarse screen work, such as newspaper printing, they are satisfactory and eminently in order. Mats are not printed from directly. They are used in the production of flat or curved stereotypes.

1. Direct-Pressure Mats. Original plates of hard zinc, copper, and brass in line, halftone screen, or combination, as well as electros, will produce satisfactory direct-pressure mats.

2. Rolled Mats. Rolled mats tend to strain the pattern and therefore require sturdier patterns than the direct-pressure mats mentioned above.

3. Dry Mats. The dry mat, widely used in newspaper reproduction as a stereo mold, is basically paper and may be produced either by direct pressure or by rolling. Depth of impression and flexibility are two of its more desirable features.

4. Wet Mats. The wet mat is composed of tissue, papers, and paste, and produced by either direct pressure or rolling. Widely used in syndicate

newspaper color jobs, the wet mat shrinks less than a dry mat and costs about the same.

5. Surface or Coated Mats. The surface or coated mat is a better grade of mat, coated with one of any number of materials (usually clay) and a binder. Surface mats offer less shrinkage, greater depth, and glossy solids, but suffer a slight loss of detail when direct-pressure molded.

PATENTED MATS

1. Rapid Plastic Magazine Mats. Rapid plastic magazine mats are produced on a base that is coated with a formula created to provide precise impressions on both base and surface. These mats reproduce process plates from stereotypes and are designed for use in high-grade printing jobs.

2. Silvertone Mats. Paper based, the patented Silvertone mat is chemically treated (at the base) for flexibility and pliability. Metallic emulsions give it a smooth surface so that the grain texture of the paper base does not affect the plate. Its shrinkage is negligible.

3. Wood Ad Mats. The Wood advertising mat produces halftone or line cuts clearly and sharply. Easily molded, it is valuable in daily or weekly newspaper work because it reproduces accurate flat casts: ("Wood" is a proper name, not a material.)

4. Wood Graphic Mats. Excellent for reproducing tonal gradations, Wood graphic mats stand up well under exacting circumstances. Molded by direct pressure and dried on the form in one operation, this smooth, even-face mat guarantees solid blacks.

5. Wood Hill Plastex Mats. Used in multicolor work and quality advertising, the Wood Hill Plastex mat gives positive detail registration. It is excellent for newspaper reproduction.

STEREOTYPES

The stereotype duplicate plate may be made only from a mat. Unless nickel-faced or otherwise especially prepared, it is not used on important jobs, or in magazine advertisements where a large press run is scheduled. The process is simply a way of making duplicates quickly and less expensively than by any other method. Stereotypes are made flat for flat-bed printing or curved for rotary presses.

Since stereos in job printing do not have a plane surface, much makeready is required. Because the plate is hard and brittle, it is more difficult to correct or revise than an electro. Stereos are most satisfactory on jobs superior to newspaper work—for business forms, books, wrappers, and the like.

A nickel-faced stereo stands up under a long run, but will not give detail as sharply as an electro or special-process stereo. Plating the surface of a regular stereo with .0002 inches of chromium will more than double its printing life.

The Silvertype stereo is a patented process made from a prepared Silvertone mat. When molded and baked in the original forms, it may be used for accurate register in color work. It is cheaper and more quickly made than some electros.

PLASTIC PRINTING PLATES

Plastic printing plates, a recent development in letterpress printing, are made of a mold of a very thin face of plastic, which is not initially flat. The mold is fastened to a flat backing, strong enough to hold the plastic face flat and accurate.

Molding is done from a matrix of resilient elastic material—such as rubber or elastoplastic—which will take the type of form in full depth. Thermosetting plastic is molded into this to form the printing plate, and produces a very thin printing face (enabling the matrix to be bent freely when parted from the plate) which is mounted on a suitable backing. Plastic plates weigh very little, and are therefore inexpensive to ship or mail. They are hard and wear well, even under heavy impression, printing on rough paper, at high speed, and under poor press conditions. Satisfactory printing conditions are quickly achieved on these plates, since, because of differences in surface tension, printing ink spreads over a resin surface more readily.

It has been claimed that, on a large scale, plastic plates can be produced at a comparatively low cost, with little or no savings for custom work. As yet, however, their production is limited to flat plates of one color, ranging in thickness from .152 of an inch to .918 of an inch. Plastic plates demand good original composition locked with high spaces; engravings and electros for type forms should be metal-backed for best results. Both these, to be reproduced separately, are unmounted pattern plates. A considerable amount of research work is now being conducted on behalf of plastic in the graphic arts. Newly developed products include plastic duplicates comparable to electrotypes, plastic stereotypes, plastic mats, and machine or acid-etched plastic originals.

DUPLICATE ORIGINALS

When an advertisement is scheduled in several magazines at about the same time and it is impossible to stagger dates so that the original plate may be forwarded from one magazine to another, duplicate originals are substituted.

In the past, the costly and time-consuming practice of making several sets of originals was employed. Today, however, a method of making

duplicate originals has been developed by several large electrotype houses in order to save time, money, and labor.

Duplicate originals are high-grade electros with a solid base of copper and a nickel face. Stronger than even a good pattern plate, these plates are still clear after molding over 40 sets of duplicate printing plates.

To make a duplicate original, the form which is sent to the foundry must retain all its dead metal (see p. 109), bearers, and have a ⅛-inch channel rout. Prior to the molding, the 16 gauge of the type and original should be incorporated.

Two types of duplicate originals are available. One, mentioned previously, is nickel; the other is copper. In four-color work three to four days are usually required to make the first, and five to seven for the second. The solid copper plate is preferable should any re-etching or reworking by hand be required. Magazines use these plates to mold their press plates; it is important that the best possible material be supplied to them.

PATTERN PLATES

When reruns of an advertisement will be required during an extensive campaign or at some future date, pattern plates are ordered. Basically, this plate is a form of electrotype that will stand considerable molding as the result of special care during preparation. It may be an electro; or it may be an electro of type matter combined with an original halftone or with a lead-mold nickeltype from the original.

More than one plate is usually made, to prevent buckling of the pattern before all the electros and mats are run off. Hence, two or more electros or mats are made at one time. A pattern plate may be kept on file at the foundry for reordering duplicates or mats on short notice during a large newspaper campaign.

Whenever a pattern is desired, the electrotyper should be so advised in order that he may take extra care in preparing the electro, leaving wide bearers and dead metal. He will also shave the plate to a thickness of .165 of an inch.

Because the quality of a reproduction, especially of a halftone, decreases as the number of steps away from the original art work increases, extreme care must be taken with the preparation of the art and the original plate and with the locking up of the forms in the foundry. The proper depth in highlight, shadow, tonal areas, and screen is of utmost importance.

It is not wise to block plates that will be molded. The nails have a tendency to draw down the parts of the plate near them. This weakens the original and lessens its ability to withstand pressure. If the plate has been blocked, the block must be removed and the plate sweated onto metal. This means that the back of the plate is completely

cleaned, the enamel and tar removed, and the back sanded to make sure the copper is clean.

A piece of hard metal larger than the plate is then covered with a layer of tin foil; on this is placed the original, back down, after the back has been coated with acid. When heat is applied, the tin foil melts, thereby sweating the original onto the hard metal. After cooling, the dead metal and bearers, which have been previously routed, must be replaced, and the plate shaved to .165 inch. To meet the specifications of the approved proof, the original (sweated on) and the type electro may be cut apart and patched together again in the proper position. The plate may then be shaved to pattern thickness (.152 inch) and finished in preparation for molding.

DUPLICATE PLATE PRODUCTION SUGGESTIONS

To obtain the best possible quality in the duplicate plates to be ordered, the production man should bear in mind the following considerations.

Electros should be made from original line or halftone plates and substituted for the originals for long runs or reprints because, while worn electros can be replaced, originals must be kept in excellent condition for later duplication.

All copy reproduced on an electro must be type-high, and the type must be in good condition. There can be no broken rules, cuts must be firmly mounted, and the form must be locked solidly with heavy bearers planed all around.

To guard against mistakes, clear, complete instructions should be enclosed with the plates, although identification is assured when the slug with the sender's name and address is locked up with the bearers.

During routing, the quantity of each color is marked on the proof and, if the work is scheduled for unusual purposes, that fact is noted.

For better and sharper electros and stereos, all originals should be trimmed sharply on all edges and cleaned before molding.

When Monotype type forms are sent to the foundry, they should not contain low blank slugs or low quads. High material throughout the form is better for electrotyping, as it will prevent molding material from seeping in between type or cuts, and from wedging and forcing them out of position.

Dead metal and bearers should be left on the original plates, which are kept unblocked if they are to be lead-molded at the foundry; better electros and perfect register in three- and four-color process work will result.

Four types of molding media are used in electrotype work: lead, Tenaplate, Vinylite, and wax. Lead and Vinylite are chosen for precise reproductions of fine halftones (see p. 97.) Tenaplate molds are used

successfully when originals are blocked and made up with the type; wax is adequate for type, line cuts, and halftones where perfect duplication of the original is not absolutely necessary. Lead molding registers the most readily; heat-treated electrotypes resist mashing or battering best; ink consumption is lowest on chromium and highest on copper.

In relation to respective finishes, the approximate length of runs on copper is 150,000; on nickel it is 500,000; on steel, 500,000; on chromium, about 1,000,000. Originals and electros of the same height, mounted on wood blocks, may be used together on a run that is not too large.

By making a zinc etching of an entire piece of art with an electro for each color, it is possible to make color plates from line drawings. Any metal not intended to print in a given color is routed from the original and from each electro. This process is less expensive than a full set of original color plates. For color jobs, nickel plates are desirable, as copper is more easily affected by the chemicals in the inks.

Wherever joining is required, any type or corners of the rule border must be marked, otherwise the special surface will not be joined. Excessive joining will lead to extra charges.

If an electro of a halftone picture is being electrotyped as a single unit, the foundry can incorporate the illustration from the original form right into a new plate when only one advertisement is necessary. Any electro made from another halftone electro is never as good as one made from an original plate, but certain patented processes are employed by some electrotypers to produce excellent quality electros from another electro.

For newspaper work, an electro should be the standard thickness of .152 inch. In newspaper color printing, electros are used when the advertisement is less than a full page in size, and these electros are not routed unless the newspaper lacks facilities for this work. When the advertisement is a full page, however, the newspaper masthead is included in the black plate. High, dead metal and clean, sharp mats result in better stereos.

For pulp magazines, the electros should be unblocked and nickel-faced, and they should be made from originals which are sharp and clean for molding purposes.

It is necessary to obtain the specific requirements of each publication—especially of foreign publications—regarding screen, etching depth, blocking, mats, process colors, etc., before producing copy and plates, since these publications vary from each other as well as from the United States standards. In magazine work, the specifications of each publication should be checked when the same plate is to be used in several periodicals. Probably specifications will not be alike, and advance knowledge is desirable so proper allowances can be made.

Curved electrotypes require great care and as nearly solid a surface as possible, since register and dimensions may change during the curving process. Locking the forms for curved electros must be done very solidly, and higher spacing material and wider bearers must be used in order to preserve register and minimize dimensional changes during the curving. These electros will wear longer if they fit so securely around the cylinder that they will not break, buckle, or wear excessively.

A really good electro will save time in make-ready by bringing all lines to a proper printing level. For type or picture areas in different colors, all type must be set in the same form and an electro made for each color. On each plate, all sections that do not print in a given color must be routed out at the foundry to assure perfect color register, without handling costs and charges for making up two type forms and with savings on composition and press time. By preregistering the plates on two sides, the electrotyper can assist in the press register. In color work, beveled electros, unmounted, on 11-point metal (for patent base) reduce register time, and assure a firmer impression and more accurate register. To facilitate mounting on a base, unmounted electros should be beveled or be surrounded by surplus metal.

Close register of colors in printing from curved electros should be avoided. Shrinkage of press plates when being curved tend to spoil close-register jobs. It is difficult to allow for this shrinkage when preparing copy. The best precaution is to design the job so that no close register will be needed or have sufficient overlap.

The quality of an electrotype can be checked with a corresponding proof, that has been pulled from the original plate, to make certain that all detail, depth, and register of color plates are exactly as in the original.

WAX ENGRAVING

A wax engraving is actually a wax-engraved electrotype. It is prepared in the same manner as electrotypes with the exception of the preparation of the mold. In electrotyping, the subject to be duplicated is molded directly into the wax case, while in wax engraving all or part of the mold is prepared by cutting or stamping in the wax.

Wax engravings are definitely the easiest and probably the cheapest and cleanest method for reproducing ruled forms, maps, charts, diagrams, and logarithmic paper. On complicated ruling jobs it is wise to get an estimate from a wax engraver. Wax engravings will probably prove economical for this kind of work, and only a pencil layout need be supplied. Tabular material containing much type composition can be prepared by wax-mold electros from type set by the printer, and the electrotyper can make the rules in the mold. Highly efficient in the preparation of intricate tabular work, this type of engraving is highly



Fig. 4–17. Staining the Copper. Top of the copper is stained black, and then a layer of gray wax is evenly flowed over the stained copper surface.

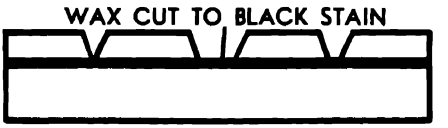


Fig. 4–18. Cutting. Design is hand engraved, machine ruled, or photographed onto wax. Type may be machine stamped into wax. When photographed, developed image is tooling guide.

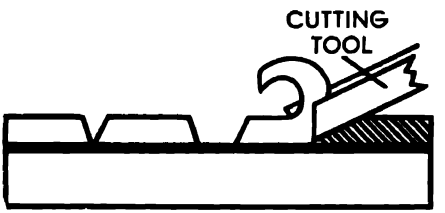


Fig. 4–19. Depth of Cut. Engraver tools design to the copper surface revealed by black stain.

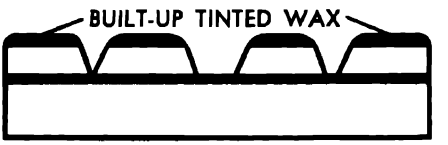


Fig. 4–20. Building Up. Blank areas are built up with more wax, as in preparation of electrotype mold. Built-up areas are tinted for easy identification. Wax plate is graphited, as electrotype mold. Usual electrotyping process is followed.

recommended when it is certain that there will be no last minute changes or where the plate can be reused with minor alterations. The steps involved in the wax-engraving process are shown in Figures 4–17 through 4–20.

A complete case (mold) may be prepared and cut by hand from a layout, molded from a type form or a plate, or by a combination of these methods. From a rough sketch, the wax engraver can hand rule all the line work into the wax-coated plate. The hand-rule line work is dusted with white powder in order to guide clearly the machine-engraver.

It is thus possible to incorporate rules, borders, geometric designs, etc., into a printing plate and to be sure that all borders and rules cross and join perfectly. A modern engraving machine can be employed. This machine has an accuracy of one-thousandth of an inch (.001 inch).

For maps or diagrams containing a lot of detail, the wax surface is sensitized photographically so that it may receive a print from a photographic negative. The wax is then hand- or machine-cut, the surface print serving as a guide or pattern for cutting.

Corrections can be made easily in this process. Wax in the case is melted where necessary, obliterating the error, the wax is smoothed out, and the correct detail is then cut into the new surface.

When used judiciously, wax engravings may often make the employ-

ment of combination plates unnecessary. The finished wax plate serves as a mold on which copper is deposited electrolytically, as in conventional electrotyping. Actually, the finished plate is an electrotype, blocked, unblocked, or curved.

DUPLICATE PLATE TERMS

Aluminotypes. Aluminotype duplicate plates are made of an aluminum alloy from a plaster composition mold under pressure, according to a patented process.

Anchor. When an electrotype or other plate is fastened to its base with solder poured through holes in the base it is anchored. Plates are anchored where there is no room to use nails.

Anode. (1) The anode is the positive terminal in a conducting circuit as opposed to cathode. (2) In electrotyping, the anode is the piece of copper or nickel placed in the bath, from which the shell is deposited on the mold.

Bearers. The term "bearers" refers to: (1) narrow strips of wood or metal in a form of type which protects the form while taking proofs; (2) bands of metal around the ends of the cylinder and strips of metal on the bed of the press, which run together to prevent the crushing of the form; or (3) pieces of metal, type-high, placed around a type form or engraving to protect it during the process of electrotyping.

Beveled Edges. Unblocked electrotypes are beveled at the edges to provide a surface that can be gripped by hooks which hold the plate down and in position on a patent base.

Cathode. (1) The cathode is the negative terminal in a conducting circuit. (2) In electrotyping, the cathode is the electrosensitized mold on which the shell of copper is deposited.

Curved Plate. An electrotype or stereotype which is backed up and curved to fit the cylinder of a rotary press is called a curved plate.

Dead Metal. Type-high metal in noncopy or nonprinting areas of a plate is spoken of as "dead metal." It is often left in the original to lend strength to the plate under the pressure of molding. Dead metal is routed out of the printing electrotype.

Foundry Chase. A small strong frame made of cast iron, the foundry chase, is used in locking up forms for electrotyping.

Frisket. A paper mask, called a frisket, is used to prevent the dead metal and bearers of an original from receiving ink, thereby enabling

proofs to be pulled in such a manner that dead metal and bearers can be kept in the plate without showing on the proofs.

Patent Base. A metal slab whose surface is either grooved with diagonal lines or has holes in a honeycomb pattern is called a patent base. Hooks can be inserted and locked into the grooves or holes in such a manner as to firmly fasten beveled electrotypes to the base.

Premake-ready. A method of accomplishing the make-ready process in the manufacturing of the photoengraving, electrotype, or mat before it is sent to the pressroom.

Recast. When a printing plate is made over, it is "recast."

Rubber Plates. Rubber plates may be made from properly prepared type, photoengravings, electros, or stereos, either singly or in combinations. Rubber printing plates are vulcanized over the matrix obtained from the original form.

Rubber Stamps. Rubber stamps are molded in vulcanized rubber and mounted for stamping by hand or for other purposes. Copy for rubber stamps is set in type and a form prepared as for stereotype molding; an impression is then made in a plastic substance and a piece of sheet rubber is placed on this mold. Mold and rubber are subjected to heavy pressure and strong heat (about 300 degrees) until the rubber is molded to shape. When cool, rubber and mold are separated and the molded rubber mounted for use.

Vacuum Lead Molds. Before the pouring operation, a vacuum is created about the shell and remains during the cooling period. The danger of a sudden contraction of the shell is eliminated by this treatment.

Wood Base. This is a block of wood upon which an electrotype, zinc, or halftone plate is mounted type-high. Wood bases usually suffice for small plates for short runs, but, for heavy plates and many impressions, solid metal bases are preferred.

5

PAPER

SHORT HISTORY OF PAPER

The first material used in making paper was the papyrus plant developed in Egypt about 3000 B.C. However, this cannot be considered paper in the modern sense. The writing surface of papyrus was achieved by cross-weaving the stripped stalks, pasting them together with fruit juices, and pounding them with a stone to the proper thickness.

Ts'ai Lun of China is recognized as the first papermaker. In A.D. 104, he invented a method of reclaiming and separating vegetable fibers (chiefly from bamboo and the inner bark of the mulberry tree) and forming them into a web by floating them in water and allowing them to dry and settle.

The Arabs learned the secret during a conquest of China in A.D. 704 and brought it back to Samarkand. During the following seven centuries, it traveled to Morocco, Spain, France, and Germany, finally arriving in England in 1494. It did not reach the United States until 1690.

In 1798, Nicholas Louis Roberts, a clerk in the paper mills of Didot & Co. at Essenay, France, invented the present papermaking machine. The patent was sold to the Fourdrinier Brothers in England who have given it its name.

Rags were the chief source of fibers until 1840, when Keller, a German, invented a wood grinder that broke down the hard structure of wood, opening up a new and unlimited source of supply. Chemical wood pulp became available in 1852 when Burgess of England completed his method of using caustic soda in separating the cellulose fibers. The sulfite (sulfurous acid) and the sulfate (modified caustic soda) processes soon followed.

Theoretically, any vegetable growth can be used in making paper, for the structure of vegetation is cellulose fiber. Because of the supply and

relative yield, however, certain kinds of trees, cotton, and other vegetable fibers processed for cloth are used almost exclusively.

Paper can be defined as a matted web of cellulose fibers—a fibrous substance found in all plant growth. For papermaking purposes, the number of sources is limited by reason of availability, quality, and cost. Except for a few special papers for which rice and wheat straws, corn stalks, or such grasses as hemp, jute, and esparto are used, the sources are primarily limited to cotton, generally obtained from rags; wood plants; and secondary pulps or fibers reclaimed from waste papers. There are also several important nonfibrous raw materials such as sizing, fillers, alum, and dyes.

PROPERTIES AND REQUIREMENTS OF PAPER

A particular paper has its beginning when the formula for it is assembled. A formula is predicated entirely on the intended use of the paper and thus the characteristics it must be given. The following list covers those most usually considered.

Physical Properties. (1) Color and brightness; (2) strength; (3) finish; (4) formation; (5) sizing; (6) bulk; (7) opacity; (8) cleanliness (9) moisture content.

Use Requirements. (1) Ink receptivity; (2) printing; (3) surface; (4) reaction to chemicals; (5) special requirements of different printing or converting processes; (6) permanence; (7) physical properties.

THE MANUFACTURE OF PAPER

Paper is made from cellulose vegetable fibers obtained from either wood or rags. When making wood-pulp paper, logs are cut to chips by revolving knives. When making paper from rags, the material is sorted, dusted, boiled, washed, and bleached.

PULP

The major functions of pulp preparation are to progressively increase:

1. Cohesive strength of the sheet
2. Density of the sheet
3. Self-sizing
4. Wear resistance and permanence
5. Hardness, rattle, and snap of the paper

To answer the question, "What pulps are needed to cover these specific requirements?" necessitates not only a knowledge of the characteristics of each pulp as a class, but also an understanding of the differences within each class. For example, spruce fibers from trees grown in the Northwest will differ in certain respects from those grown in the Northeast; pulp mill operations also cause differences. However, the following generalizations can only cover the classes as a whole.

Rag Pulps. As the name indicates, rag pulps are obtained from fabrics. Cotton rags, being almost pure cellulose, are chiefly used. Rag fiber is soft and pliable and, subjected to prolonged preparation, produces a strong, durable paper.

There are various qualities of rags, the best being new white clippings. Cotton linters are another source, but do not equal the superior qualities of new white rags.

Chemical Wood Pulps—Soda Pulp. This process, using caustic soda as the cooking agent, is usually applied to deciduous woods. Poplar is the most prominent. The fibers are soft, short, tubular, and bulky, with little strength. Soda pulp requires slight preparation for the fibers are already short and their structure and bulking qualities quickly break down.

Sulfite. In the sulfite process, calcium bisulfite is the cooking liquor that separates the fibers from nonfibrous binding materials. Hemlock, spruce, some pines, balsam, fir, and a few other coniferous woods react best. This fiber is long, soft, and flat, with considerable strength but little bulk. It bleaches a good white without serious effect on its strength and responds well to preparation.

Sulfate. The sulfate, or kraft, process is applied to such pitchy woods as the pines, the cooking agent being a modified form of caustic soda. Sulfate fibers are the strongest, longest, and hardest of all chemically refined pulps. Until recently, it has been used almost entirely in kraft papers for wrappings, bags, and other purposes.

The coarseness of the fibers made them impractical for printing papers and it had been impossible to bleach them to a bright white without destroying the strength. Recent developments in the cooking and bleaching processes have produced pulp in which a good color can be secured without much loss in strength.

Alpha Pulp. This is a purified fiber of a high white color obtained by eliminating the less desirable forms of cellulose found in wood pulps. It is used extensively in papermaking as a substitute for more costly rag stock. It gives the paper a raglike feel and has greater performance than ordinary wood pulps.

Mechanical Wood Pulp. Mechanical, or ground, wood pulp is obtained by forcing the logs against a grindstone which shreds them into a fibrous mass. After screening to remove large particles, this pulp is immediately ready to put over the paper machine. Spruce, hemlock, and balsam are the chief sources. In the chemical wood processes, only about one half the original weight of the wood is reclaimed, whereas in the ground wood process it is over 90 percent. This means that the impure, nonfibrous

elements in the wood are largely retained. They cause quick discoloration, loss of strength, and disintegration.

Reclaimed Pulps. Papers can be repulped and thus used over again in small percentages. Unprinted papers need only be repulped. Printed papers are reclaimed by cooking them in a weak solution of alkali to wash out the ink, after which they are again bleached. Since the fibers have been through the process before, they are short and well hydrated, requiring little additional refining.

Generally speaking, long-fiber pulps are needed for strength, hardness, or endurance, as in bond papers; varying mixtures of long and short fibers are necessary for bulk, opacity, smoothness, and other printing qualities. The best results occur when a balance is maintained between fiber length and degree of preparation.

BASIC STEPS IN THE PAPERMAKING PROCESS

Cooking. A large tank, called the digester, cooks the wood chips under pressure and steam in a prepared chemical solution, thereby separating the cellulose fiber. Impurities are eliminated chemically. (See Figs. 5–1 and 5–2.)

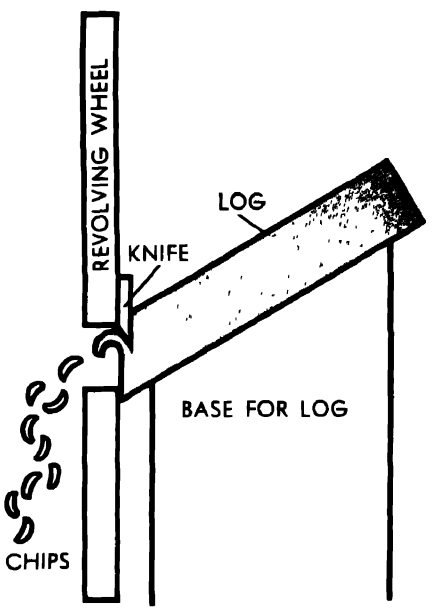


Fig. 5–1 (*Above*). Chipping. The logs are cut to chips by knives.

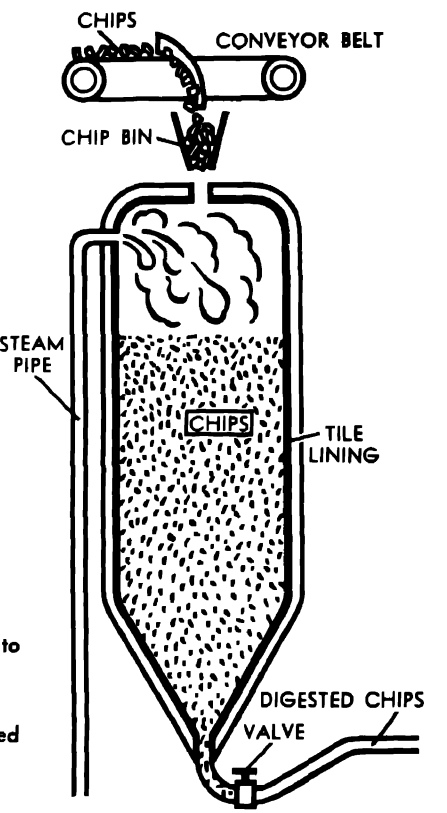


Fig. 5–2 (*Right*). Cooking. The chips are digested by steam cooking.

Beating. The beating process produces hydration, which mixes the pulp with water. This breaks up the fibers, so that they will enmesh in the sheet. To size the paper, glue, starch, or rosin is used. A clay filler is added to give the paper opacity, and dyes are added to give color. The physical properties of paper, such as strength, tear, folding qualities, and other factors, depend on the length of beating time, the flow of pulp and various fiber characteristics.

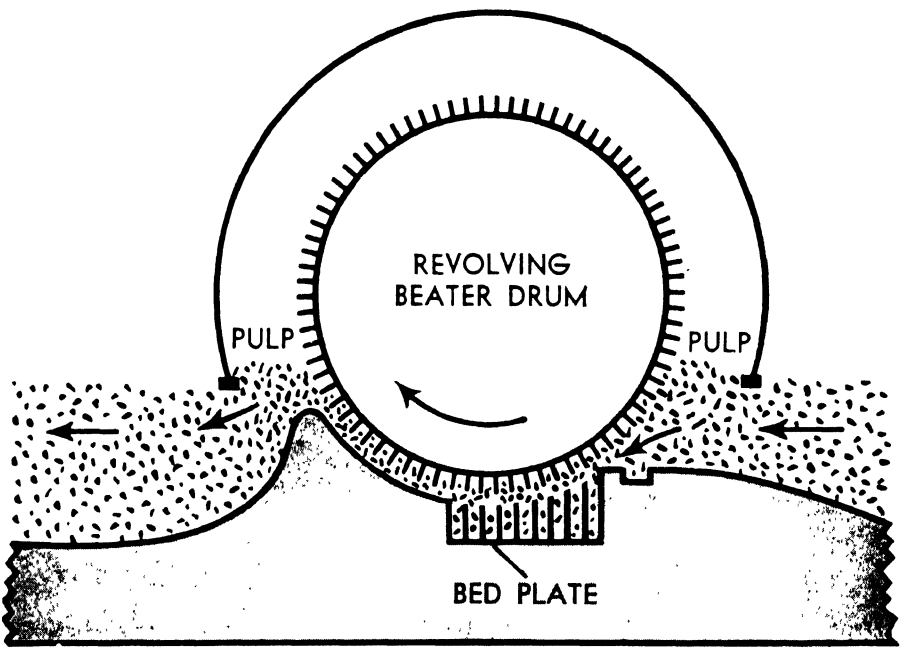


Fig. 5–3. Beating. This produces hydration that breaks up the fibers so that they will enmesh in the sheet.

Jordan. The refining process is supplemented by the Jordan machine. Here the pulp gets another beating which breaks up the fibers to more uniform length, and splits their ends to permit acceptance of the necessary amount of water. This treatment enables the fibers to take form on the paper machine.

Fourdrinier. After the beating process, the wet pulp, containing 99 percent water, is fed to the Fourdrinier. This machine filters impurities and foreign matter through a fine wire-mesh screen. This screen vibrates constantly, enabling the fiber to interwind and interlace more closely, thereby creating a more strongly meshed web of paper.

Dandy Roll. The dandy roll is a skeleton cylinder consisting of a laid, wove, or watermark screen. As the paper passes under the roll, the pattern is impressed into the web. (See Figs. 5–4, 5–5, and 5–6.)

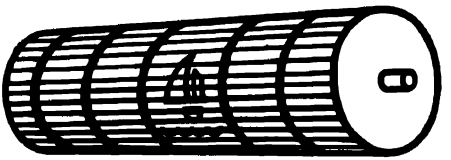


Fig. 5–4. Dandy Roll. The paper web passes under the roll to receive laid or woven pattern and watermark.

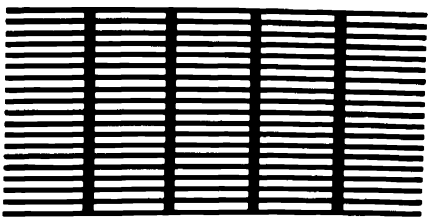


Fig. 5–5. Laid Design. Detail of the screen wire on the dandy roll that gives paper web "laid design."

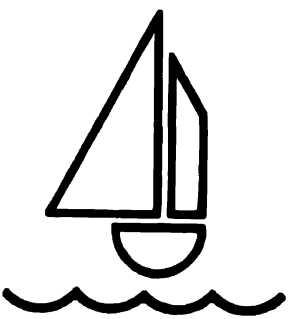


Fig. 5–6. Watermark Design.

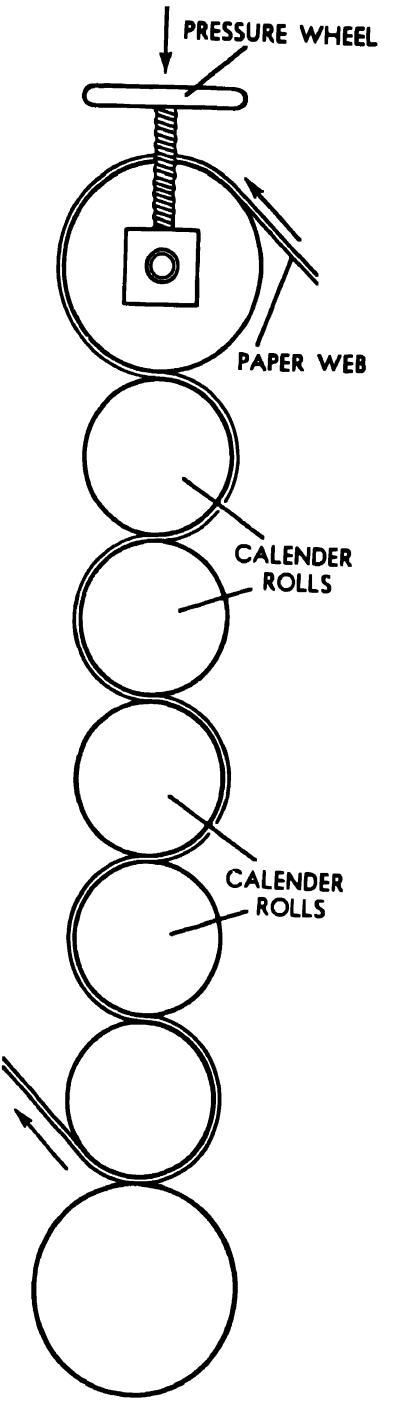


Fig. 5–7 (*Right*). Typical Calendering Machine. The paper receives its finish. The higher the finish desired, the more calender rolls the paper goes through or the greater the pressure at the nips.

Drying. The web is passed over suction boxes, and a series of steam-heated drying rolls drain off the excess water. Felt blankets, applied to one side, blot up still more water and prevent wrinkling and curling. This completes the drying process.

Calendering. After the paper has been thoroughly dried, it is ready for calendering. This process gives the paper finish and smoothness by running it through calender rolls. The amount of finish and smoothness depends on the number of rolls used (see Fig. 5–7). In supercalendering, the paper is actually ironed by pressure, friction, and steam, and more rolls are used.

Coating. Coating is a separate process added to the Fourdrinier machine. The coating consists of clay and chalk mixed with casein, which serves as an adhesive. Dye is added if color-coated paper is desired.

The paper is dipped into a vat containing the coating mixture. It runs through rollers containing brushes which distribute the mixture evenly and then passes through two heating units. Finally the sheets are rewound and packed ready for shipping.

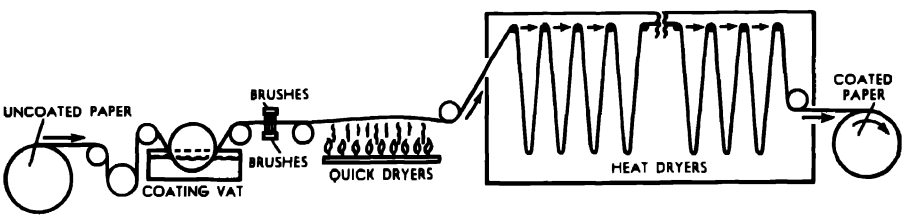


Fig. 5–8. Coating. The web is dipped in a vat containing the coating mixture, which is evenly distributed by the revolving brushes, and is then dried.

FINISHES

Of the wide variety of paper finishes, some are attained on the paper machine and others in separate operations. On the machine, with a few exceptions, the range is from a rough and bulky antique to a smooth English finish. Separate operations are required for supercalendered, coated, glazed, embossed fancy finishes, and other special or decorated finishes.

Machine-coated Paper. Machine coating is carried out as a part of the papermaking machine operation and at the regular speeds of paper production. Machine coaters were planned with the idea of filling the pores of the body stock, but they still left most of the paper surface predominately fibrous. Today, great improvements have been made and

the weight of coatings has been increased to 8 to 10 pounds per ream per side, and the quality is as good as some of the conventional coateds.

Embossed and Fancy Finishes. These finishes are too numerous to mention. They are usually secured by putting the paper between companion male and female rolls, the designs being in relief on the surface of the rolls.

TESTING—PHYSICAL TESTS—WEIGHT

Paper scales are especially constructed to indicate the weight of a ream of 500 sheets and also 480 sheets. The accuracy of the paper that is being made is thus easily determined, and converting the ream weight for the basis size of that kind of paper is simplified.

There are several formulas for converting an odd-size weight to its basis weight or vice versa. The simplest one is to use this equation: the square inch area of a size, (A): its weight, (B) = the square inch area of the basis size, (C): the basis weight, (D). Then D will equal $B \times C = A$, and B will equal $A \times D \div C$.

Basic Weights and Sizes. Paper is usually sold by weight, size, and quantity. The standard papers are classified in six groups. Basic size and weight line in each of the following tables is in italic type.

1. *Antique and machine-finish papers* are available in nine basic weights, ranging from 30 to 100 pounds. This type paper is available in eleven sizes with a basic size of 25 × 38 inches.

Uncoated: antique, eggshell, e.f., m.f., super

22½ × 35	25	29	33	37½	41½	49½	58	66½	83
24 × 36	27	32	36	41	45	55	64	73	91
25 × 38	*30*	*35*	*40*	*45*	*50*	*60*	*70*	*80*	*100*
28 × 42	37	43	50	56	62	74	87	99	124
28 × 44	39	45	52	58	65	78	91	104	130
30½ × 41	39	46	53	59	66	79	92	105	132
32 × 44	44	52	59	67	74	89	104	119	148
33 × 44	46	53	61	69	76	92	107	122	153
35 × 45	50	58	66	75	83	99	116	133	166
36 × 48	54	64	72	82	90	110	128	146	182
38 × 50	60	70	80	90	100	120	140	160	200

(*See Appendix I, B.*)

2. *Coated papers,* either dull-coated, glossy, or enamel finished, are also manufactured in nine basic weights ranging from 37 to 120 pounds. Coated papers are available in ten sizes, the basic size being 25 × 38 inches.

Coated: glossy and dull

22½ × 35	30½	38	41½	49½	58	66½	74½	83	99½
24 × 36	34	42	45	55	64	73	82	91	109
25 × 38	*37*	*46*	*50*	*60*	*70*	*80*	*90*	*100*	*120*
26 × 40	41	50	55	66	77	88	99	109	131
28 × 42	46	57	62	74	87	99	111	124	149
28 × 44	48	60	65	78	91	104	117	130	156
32 × 44	55	68	74	89	104	119	133	148	178
35 × 45	61	76	83	99	116	133	149	166	199
36 × 48	68	84	90	110	128	146	164	182	218
38 × 50	74	92	100	120	140	160	180	200	240

(*See Appendix I, H and H–1.*)

3. *Coated litho and label papers* are coated on one side only, and are available in 50, 60, 70, and 80 pound weights. The basic size is 25 × 38 inches, and nine additional sizes are also manufactured.

Coated one side: litho and label

20 × 26	27½	33	38½	44
25 × 38	*50*	*60*	*70*	*80*
26 × 40	55	66	77	88
28 × 42	62	74	87	99
28 × 44	65	78	91	104
32 × 44	74	89	104	119
34 × 45	83	99	116	133
36 × 48	90	110	128	146
38 × 50	100	120	140	160
41 × 54	117	140	163	186

4. *Cover papers* are made in four different sizes, with a standard size of 20 × 26 inches. They are available in eight weights ranging from 25 to 100 pounds.

Cover

20 × 26	*25*	*35*	*40*	*50*	*65*	*80*	*90*	*100*
23 × 35	38½	54	62	77½	100½	124	139½	155
26 × 40	50	70	80	100	130	160	180	200
35 × 46	77	108	124	155	201	248	279	309½

(*See Appendix I, H and H–1.*)

5. *Offset paper,* both regular finish and special finish, has a basic size of 25 × 38 inches and is available in ten other sizes. The seven basic weights range from 50 to 150 pounds.

Offset: regular and special finishes

22½ × 35	41½	49½	58	66½	83	99½	124½
25 × 38	*50*	*60*	*70*	*80*	*100*	*120*	*150*
28 × 42	62	74	87	99	124	149	186
28 × 44	65	78	91	104	130	156	195
32 × 44	74	89	104	119	148	178	222
35 × 45	83	99	116	133	166	199	249
36 × 48	90	110	128	146	182	218	272
38 × 50	100	120	140	160	200	240	300
38 × 52	104	125	146	166	208	250	312
41 × 54	117	140	163	186	233	280	350
44 × 64	148	178	208	238	296	356	444

(*See Appendix I, A and G.*)

6. *Writing papers,* consisting of bonds and ledgers, are manufactured in seven sizes with a basic size 17 × 22 inches. The basic weights number nine, ranging from 13 to 44 pounds.

Bond—writing and ledger

17 × 22	*13*	*16*	*20*	*24*	*28*	*32*	*36*	*40*	*44*
17 × 28	16½	20½	25½	30½	35½	40½	46	51	56
19 × 24	16	19½	24½	29½	34	39	44	49	53½
22 × 34	26	32	40	48	56	64	72	80	88
24 × 38	32	39	49	59	68	78	88	98	107
24 × 34	33	41	51	61	71	81	92	102	112
34 × 44	52	64	80	96	112	128	144	160	176

(*See Appendix I, C.*)

FUNCTIONAL REQUIREMENTS OF PAPER

PAPER CHARACTERISTICS

Selection of paper for quality, utility, and adaptability to specific requirements is a technical problem which involves weighing a number of characteristics, often conflicting. This problem is better solved by the printer than by the buyer of printing, since the printer is thoroughly acquainted with the immediate market and the quality of various stocks; also he can more closely estimate the amount and kind of paper required by length of the run, the kind of job, and the size and number of pages. Because the best available paper for the job should be obtained, it is wisest to let the printer either specify or order the stock. Hence, the printer should be in a position to answer the following questions:

1. How long will this printed piece be used or referred to?
2. How much handling will be required?
3. Will the job be folded?
4. Will the piece be mounted, die-cut, coated, or finished?
5. Will it be mailed, so that the weight must be kept within a certain limit?

The printer or paper supplier can translate answers to these questions into terms regarding paper quality. After considering characteristics of possible stocks, he will make his selection from the stock available, choosing the paper he believes best suited for the job. Some of the factors he must consider are listed in the following paragraphs.

Abrasiveness. Abrasive particles, occasionally found in paper, tend to wear letterpress plates and scratch the nonprinting surface in gravure cylinders. This causes fine hairlines to print on nonprinting areas.

Acidity. A high acid content affects the durability and strength of the paper fibers and sometimes causes deterioration. Acidity may be tested for and measured in several ways; the acid content of paper is expressed in terms of pH value. Amount of acidity is not important in jobs of a temporary nature, such as direct-mail throwaways, but for more permanent jobs like books, or for permanent ledger record work, the pH value should not be under 5.0.

Appearance. An unsatisfactory general appearance is contributed to by dirt, resinous specks, pieces of wood, metallic particles, and colored fibers. A mottled appearance is produced by slime spots, poor formation and crush, all of which tend to reduce opacity. Particles of bark, metal, or hair, or specks of dye, grease, oil, or resin may be found on the surface or imbedded in the body of the sheet. Especially in color work, where high quality is desired, paper of poor appearance should be avoided, as dirt on a sheet of paper may deposit dark material on a light sheet or light material on a dark sheet. For appearance's sake, high-quality jobs, especially bonds and fine writings, should always be free of dirt, as should paper that will come in contact with foodstuffs or serve as food-package labels. Dirt particles that are gritty or abrasive will wear, pit, and scratch printing plates.

Ash or Mineral Content. Mineral filler may often be derived from the pulp from which the paper is made, from surface-coating materials, from mineral-coating materials, or from metallic material picked up from piping and machinery in the mill; it may even be intentionally added. These mineral fillers do not necessarily increase the bulk of the paper, but tend rather to lodge within the voids of the sheet structure.

About 8 to 15 percent mineral filler is contained in offset papers; 15

to 25 percent in uncoated book papers. As much as 6 percent is found in bond and writing papers, where it is added to increase opacity. About 25 to 35 percent ash content is found in coated papers.

Fillers. The printing quality of ink is influenced by the nature and distribution of the paper filler, and especially by the ease with which it is wet by the ink vehicle. Fillers act as an absorptive constituent of paper; the wire side of most papers requires less ink than the felt side, although the latter is normally smoother and less porous. In coated papers, ink receptivity is influenced by the amount of coating, adhesive, and pigment, as well as by the ratio of adhesive to pigment. Mineral filler for printing papers should be free of abrasive material. Blottings, wrappings, boards, and corrugateds contain no, or comparatively little, ash.

Bulk. This term is applied to the thickness of a pile of a definite number of sheets under a specified pressure. It is important in the calculation of the thickness of books, magazines, brochures, catalogs, etc.

Bursting Strength. Bursting strength is important in selecting bag and wrapping papers, cartons, and building papers It depends on the kinds and proportion of fibers used and the amount of beating to which they have been subjected.

Compressibility. The ability of paper to resist or yield to pressure with a resultant change in thickness is called its compressibility. Compressible surfaces are more easily brought into full contact with the printing form. This characteristic is in conflict with surface smoothness.

Cracking. Coated papers tend to crack when the atmosphere is very dry. However, use of hygroscopic materials or plasticizers in the coating tends to eliminate this danger.

Curl. Curled paper does not feed well on press nor take a uniform impression. Thin papers tend to curl more than thick sheets. Humidity control in the pressroom and bindery helps reduce curl, which is a tendency of paper to balance its moisture content with that of the surrounding atmosphere.

Felt Side. The upper side of the sheet as it is being made on the Fourdrinier machine is called the felt side. The lower side is the wire side and is slightly less smooth due to its being pressed on the screen of the machine. When printing only one side, the felt side of a sheet is used.

Folding Endurance. This is an index of the resistance of a paper to repeated folding. If paper must take much folding, in processing or in use, it should be ordered accordingly.

Formation. Fiber distribution in a sheet is said to be wild when the paper appears mottled or streaked, or looks like curdled milk when held up to a light. When appearance is more uniform, like the texture of ground glass, it is said to be closely formed. Closed, uniform formation is indicative of good printing qualities as well as appearance.

Grain of Paper. The tendency of most of the fibers is to lie in the same direction. This is the result of the manner in which the pulp fibers flow, like logs in a river, on the Fourdrinier wire. The bindery or finisher should be checked to be sure the grain is correct for folding and mounting.

Ink Receptivity. The ready capacity of paper to accept the transfer of inks from printing surfaces is known as IR, or ink receptivity. Smooth, nonporous paper requires little ink. The amount of ink required by paper affects potential show through or offsetting during the press run.

Moisture Content of Paper. The amount of water held by a paper varies under different atmospheric conditions, as paper absorbs or gives off moisture in an attempt to attain equilibrium with the surrounding atmosphere. Air conditioning of the pressroom helps to keep the moisture content at a desired level.

Printing paper is least pliable when it is bone dry, thus it should be kept somewhat moist. Much changing of moisture content, however, may cause the paper to curl, and therefore is not compatible with maximum efficiency on the press. For offset lithography, where the paper is actually in contact with a dampening roller, the moisture content of the sheet is of paramount importance. If a job is to be lithographed or printed by offset, the paper supplier should be so informed well in advance.

Opacity. This is the property of a sheet of paper which renders dark objects on, or touching its further side, invisible. This quality is important in printing and wrapping papers, and is usually measured by contrast ratio.

Penetration and Absorbency. The rate at which water, writing inks, printing inks, paints, and vapors penetrate the paper or are absorbed by it may affect its utility for jobs such as packaging, outdoor posters, blotters, writing paper, etc. The relative penetration or absorbency of a sheet is influenced to a large extent by the amount and kind of mineral filler.

Permanence (of Paper). Permanence is the ability of a paper to resist either chemical action resulting from impurities in the paper itself, or agents from the surrounding air. Durability is the ability of paper to retain its original qualities after extended usage. Hydrolysis and oxidation

are the primary causes of paper deterioration, while discoloration under the action of light is generally the result of high rosin content.

Porosity. This property of paper allows passage of air when a pressure difference exists across the face of the sheet. Porosity, or air permeability, is important in determining quality of printing papers. For offset printing, the extent to which the ink will spread under the pressure of the rubber blanket is largely controlled by this quality.

Resiliency of Papers. Resiliency is the degree to which paper resists deformation resulting from outside pressure and returns, in whole or part, to its original dimension, after distortion. In letterpress printing, high resiliency is important because the type form is pressed into the paper, causing indentation. When the pressure is removed the paper should tend to spring back to its original condition. Thus paper of low resiliency, if used for letterpress printing, or for any job where it will be subjected to considerable outside applied stress, may acquire permanent indentation or an embossed effect.

Rosin Size. Sizing is a process by which rosin and other materials are incorporated into paper to give it water resistance. Low rosin content tends toward high brightness, a cleaner sheet, and better color. Highly sized paper can be made almost waterproof. Paper with little or no size can be used for blotting. In general, rosin is detrimental to permanence but increases folding endurance. If too much rosin is used, paper becomes too brittle and breaks in folding.

Smoothness. Smoothness can be tested on the principle that the closer a rigid flat surface is in contact with a paper surface, the smoother that surface. The closeness of contact can be measured by timing the speed with which air passes between the paper and the other surface.

The paper is pressed against a polished glass surface with an opening in its center leading to an air chamber. The air is pumped from the chamber creating a vacuum. When the vacuum is released, air re-enters only by passing between the paper and the glass. The time required for the mercury in the smoothness tester to drop a specified distance is an indication of the speed of air passage, hence an accurate indication of the smoothness of the paper.

Static Electricity. When pressroom humidity is relatively low, below 35 percent, static electricity may develop and hinder smooth feeding of the sheets, cause offsetting, and interfere with jogging and folding.

Surface Bonding Strength. The resistance of paper to separation of coating or fibers or to cleavage parallel to the sheet surfaces is known as surface bonding strength. When paper does not have sufficient surface

bonding strength, specks of the paper surface may come loose. This is called picking. The specks can settle in the ink trough or rollers or on the form, spoil many printed sheets, and cause a press stoppage and washup.

Surface Texture. Smooth sheets require less printing pressure in letterpress work. On the other hand, paper to be processed in automatic machinery should not be too smooth as it will slide improperly. Rough papers may be undesirably abrasive.

Tearing Resistance. Tearing resistance of paper can be tested on an apparatus which consists of a stationary and a movable jaw carried on a pendulum. The test sample is firmly fastened in the jaws whose positions are aligned when the pendulum is in an upright position. When the pendulum is released, the force of its swing is reduced by the resistance of the paper which must be torn, thereby decreasing the arc of the pendulum. The distance of the arc is measured, the measurement equalling the work done in gram centimeters by the pendulum.

Tearing Strength. Long fibers offer considerably more resistance to tear than short ones do. Tearing strength is important in paper used for bags, wrappings, boxes, and packaging.

Tensile Breaking Strength. Tensile breaking strength is important in paper used for bags, wrappings, toweling, and gummed tape. It indicates resistance of paper to rupture when subjected to longitudinal stress and corresponding strain imposed by an outside force.

Thickness. The thickness of paper is important from both an economic and a printing performance viewpoint. For example: newsprint requires printing without show through at minimum cost; index paper is planned to be durable yet to permit the filing of a maximum number of cards in a given space; book paper thickness affects the total bulk of a book or magazine.

Tight Edges. A form of curling, tight edges result when the surrounding atmosphere has a relative humidity lower than that of the pile of paper, causing exposed edges to dry out and shrink.

Water Resistance. (Also see Rosin Size.) Printing papers need not be highly sized since they are not normally called upon to resist water. However, papers for lithography are an exception and require a fairly high degree of water resistance. Bond and writing papers are highly sized so they can be written upon with aqueous ink.

Wavy Edges. The opposite of tight edges, wavy edges result from the storing of paper under conditions of relatively high humidity. Exposed

edges absorb moisture and stretch while the rest of the sheet area remains unchanged. This seriously affects the register of colors which have been printed on different days and under varying humidity conditions.

Wire Side. This is the under side of a sheet of paper—the side in contact with the wire of the paper machine during manufacture.

Wrinkling. This is similar to curling.

PRINCIPAL KINDS OF PAPER

The following compilation includes the principal kinds of printing paper used in the graphic arts, advertising, commerce, and industry generally. They are arranged alphabetically and an attempt has been made to summarize their individual characteristics and outstanding features.

Antique Paper. Books or other lengthy reading matter are often printed on antique paper (sometimes called "text") because it reflects no glare or shine, and causes no eyestrain. For advertising products with a feminine appeal, brochures often enclose pages of lightweight antique stock between covers of a heavier weight.

Antique paper has little calendering, which results in greater bulk and a velvety surface with a slight tooth. Adaptable for line engravings and type, it prints fairly heavily because of its surface softness and rough finish. Antique paper will not print halftone plates and is never used for photographic illustrations. It may be either a laid or wove paper with a deckle edge, which lends dignity and richness to the quality of appearance.

Manufactured in many colors, antique paper is available in weights ranging from 30 to 100 pounds. Weight is based on a standard size sheet of 25 × 38 inches. (See Appendix I, B.)

Bible or India Paper. Noted for permanence, strength, and opacity, this paper is often used in books containing many pages, because it does not bulk and thus permits manufacturing thinner books than would otherwise be possible.

When using Bible or India paper in letterpress printing, a 110 screen is acceptable and practical.

Manufactured in weights ranging from 17 to 33 pounds, it has a basic size of 25 × 38 inches.

Blotting Paper. Blotting paper is frequently used in direct-mail advertising. Selection of the proper type of blotting paper depends largely upon the advertising message. For example, when a monthly calendar is reproduced as part of the message, it is advisable to choose an enameled blotting paper which is durable enough to last the desired length of time.

Manufactured without sizing, blotting paper is soft, absorbent, and easily crushed. Loosely matted and absorbent on both sides, it has a tendency to pick up when an unsuitable ink is used. This general type is known as embossed antique.

To provide a better printing surface, some blotting papers have harder-finished papers pasted to one side. Known as porcelain blotting papers, they are generally unsized and fairly absorbent and are suitable for both offset and letterpress, printing halftones with a screen no finer than 85.

Enameled, offset, and metallic blotting papers have one side covered with pasted-on coated paper, offset paper, or metallic paper, respectively. The quality of the surface of the printed side will determine the printing process and the quality of its reproduction.

Produced in many colors, the weights of blotting papers vary from 100 to 140 pounds. Their base size is 19 × 24 inches.

Bond Paper. Strong, with a great resistance to tearing, bond paper is usually specified whenever printed matter requires permanence and durability. Bonds and stock certificates, letterheads, and business forms use bond exclusively.

Letterpress and offset reproduce well on bond, and both are equally economical. Halftone reproduction, however, is better with the offset process. Steel-die engravings provide an exceptionally high quality and finish for letterheads and announcements. Steel engravings are printed by the intaglio process. Although steel engravings are relatively more expensive, the cost is well warranted for those businesses that demand dignity and distinction, such as banks and the various professions.

Although some bond papers contain a mixture of rag content and sulfite pulp, the best bond papers are usually 100 percent rag. Naturally all-rag bond is both superior in quality and more expensive in cost. A good test of a bond paper's strength and quality is its ability to withstand erasures. (See Appendix I, C.)

Bond papers are available in a wide color range, although white is most generally used. During the manufacturing process, top grades are watermarked with the dandy roll. With a basic size of 17 × 22 inches, bond papers are made in weights ranging from 13 to 44 pounds. Following are six tests of good bonds.

1. *Test for crackle.* A high-grade bond has rattle and snap when shaken. Its stiffness and firmness of structure testify to its durability and give a feeling like that of crisp new bills.

2. *Test for looks.* Good bond paper, when held up to the light, appears slightly but evenly mottled (not spotty or speckled) and uniform in quality. Good bonds will not fade.

3. *Test for finish.* In high-quality bond, both sides of the sheet are exactly alike. The surface reveals smooth firm texture, slightly uneven, yet not hilly. Hills and valleys tend to make a paper of poor writing quality.

4. *Test for strength.* In testing for strength, it is important to tear the paper twice, once from the end and once from the side. Long fibers are most prominent in good bond papers. The long fiber gives bond paper its relative strength, and settles lengthwise along the wire of the Fourdrinier machine.

5. *Test for writing.* A pen actually glides along the surface of a good bond paper. Because a good bond is even and uniform with a good writing surface on both sides, a pen will not catch, miss, nor tear off little fibers from the paper.

6. *Test for wearing.* When crumpled and rubbed between the palms of the hands, a good bond does not tear but loses its fine finish and takes on the characteristics of a piece of cloth. No pinholes show when the sheet is held up to the light, as they do in the cheaper grades of bond.

Bristol Board. Bristol board is used for announcements, direct mail, menus, tags, tickets, postcards, and records. (See Appendix 1, E.)

A type of cardboard about $\frac{6}{1000}$ inch thick, Bristol board comes in three varieties: index, mill, and wedding. Index is the most common and is made on the Fourdrinier machine. Nonpasted, it is durable and nonsplitting. Wedding and mill Bristol board are made on cylinders.

With an excellent surface for letterpress printing, Bristol board also offers uniform thickness, which is a definite asset when applied to high-speed automatic recording machines.

Bristol board is also manufactured in one ply, two ply, etc. This means that two or more sheets are joined together.

Index Bristol is made in sheets $25\frac{1}{2} \times 30\frac{1}{2}$ inches with a base weight of 90 pounds. Both mill and wedding Bristol are made in sheets $22\frac{1}{2} \times 28\frac{1}{2}$ inches, with a base weight of 220 pounds.

Cardboard. Used extensively in box manufacturing, cardboard is also desirable for posters and counter cards.

A stiff, heavy, thick paper, cardboard is made by pasting several plies together in a multicylinder machine. As a rule it is composed of a cheap pulp filler with a thin coat of a sheet of coated or calendered paper. Cardboard prints in either letterpress, offset lithography, or silk screen. The quality of the printing is determined by the quality of the outside sheet.

Cardboard comes in two sizes: 22 × 28 inches and 22½ × 28½ inches. The weight is measured by ply or gauge.

Coated Paper. Magazines, direct mail, brochures, and stuffer advertising utilize this paper because of its exceptional whiteness and its ability to print clearly and give reproduction quality to color work. (See Appendix I, A, H, and H-1.)

Coated papers are especially processed papers with an adhesive coating mechanically applied to a good or inferior filler. After drying, coated paper is calendered to improve the printing surface. With a slick coat excellent for printing, coated paper is used extensively in letterpress printing, and is capable of printing halftone plates up to 200-line screen.

The base size is 25 × 38 inches, and the weights range from 37 to 120 pounds.

Some papers are coated on one side only. These are known as coated litho (coated on one side) and coated label. The latter is usually gummed on the uncoated side. This type is manufactured in weights of 50 to 80 pounds, with the same base size as the regular coated: 25 × 38 inches.

The term "coated paper" usually refers to glossy coateds. Coated paper also is available with a semidull or dull coating. The duller grades cause less eye fatigue for the reader but are more difficult to print.

Cover Paper. Cover paper, usually referred to as cover stock, is used in advertising for direct mail, booklets, brochures, and announcements.

A strong paper, highly resistant to rough handling, cover stock has many finishes and textures, some even resembling leather and cloth. Antique, ripple, laid, and wove finishes are most common.

The surface of cover stock is definitely not adaptable for halftone printing in letterpress. In offset lithography, however, tonal values reproduce very well. Line work can be printed on cover stocks, but for satisfactory results the technique must be adapted to the roughness of the particular stock selected for the job. (See Appendix I, D and E.)

Made in an unlimited color range, cover stock comes in a sheet that is generally 20 × 26 inches, with weights ranging from 25 to 100 pounds.

English Finish and Machine Finish Book. Both these papers are suitable for magazines using the letterpress printing process. They are uncoated, but offer a good printing surface and not too much bulk. Because of lack of opacity, the machine-finish paper sometimes prints through. English finish is somewhat better than machine finish, but not as good as supercalendered paper. English finish will take a 100-screen halftone, whereas machine finish cannot print anything over a 100-screen halftone.

Both papers have a basic size of 25 × 38 inches, and basic weights ranging from 30 to 100 pounds.

Gravure Paper. Gravure paper is made exclusively for the gravure printing process. Sometimes called roto paper, it prints halftone as well as line copy.

Roto paper has a smooth finish, a high moisture content, and no glare. Its resiliency is adequate to withstand the great pressure of speed during the printing operation. Rotogravure paper is soft and absorbent and therefore able to take up the fairly large amount of ink used in roto printing.

Unsized roto paper costs less, yet offers a printing result comparable to some letterpress printing jobs which use a calendered paper taking 110 screen.

Slake-sized, supercalendered book or English finish roto paper is more expensive. Used for newspaper supplements and catalogs, it has a smooth surface and is characterized by a high elastic finish.

The basic size is 25 × 38 inches, with weights ranging from 32 to 90 pounds.

Halftone Paper. Uncoated halftone paper is used for newspaper printing. Enamel-coated halftone paper is recommended for the better grade of magazine printing.

Machine-made, uncoated halftone paper of poor grade does not print well because of uneven distribution of pulp during the manufacturing process. The dot formation appears distorted and halftone reproduction is not good; newsprint requires a 65 screen.

Highly finished coated halftone paper is called enamel coated or cover coated. This type is able to print up to 150 screen.

Halftone papers are made in basic sheet size of 20 × 26 inches, and in weights of 50, 60, and 65 pounds.

Kraft Paper. Usually known as wrapping paper, this is a widely used unbleached brown paper. Extraordinarily strong, it is an excellent wrapper and is occasionally used to reinforce other papers. Although the surface will not take halftones, it will print line cuts.

Kraft papers are also manufactured in many colors suitable for gift wrapping.

Ledger Paper. Ledger paper is a permanent white record paper, sometimes termed a better bond paper.

Unsurpassed for strength and durability, it can take handling and erasures with less damage than ordinary bond papers. It accepts pen ruling and printing, and does not crack when folded.

A rag paper, usually watermarked, ledger paper has a base size of 17 × 22 inches and comes in weights of 13 to 44 pounds.

Litho or Offset Paper. This paper is made especially for offset lithography. (See Appendix I, G.)

Soft, pliable, with a fuzzy feel, offset paper is processed to eliminate stretching, shrinking, and curl as much as possible. This is necessary because offset lithography requires a slow-drying ink and is rather a damp process. Sometimes coated on one side or both, coated offset is specified for high-gloss ink printing.

With a base size of 25 × 38 inches, offset paper comes in weights of 50 to 150 pounds.

Manifold Paper. When small bulk is required and when permanency is necessary for records, manifold paper is used. Commonly known as onionskin, manifold paper is largely used for second sheets, as its carbon acceptance is excellent. Airmail writing papers are onionskin papers.

Strong and durable, manifold paper is surface-sized, and the better grades are watermarked. It is thin and somewhat transparent.

Manifold papers are available in weights of 7 and 10 pounds, with a basic size of 17 × 22 inches.

Newsprint. Paper of the type that is generally used in newspaper publishing is called "newsprint." Mechanical wood pulp with some chemical wood pulp is generally used, and the paper is machine-finished and slack-sized with little or no mineral loading. The basis weight varies from 30 to 35 pounds. Most such paper is in the neighborhood of 32 pounds.

Parchment Paper. Used for documents, diplomas, and certificates, genuine parchment is made from sheep or goat skins and is very expensive.

Parchment paper, which simulates the appearance, printing quality, toughness, and glossiness of genuine parchment, is a very high grade of bond paper which has been waterproofed.

Safety Paper. This kind of paper shows any effort made to erase or change any writing or printing on its face and is used for bank checks, tickets, money orders, or other papers of negotiable value. It is made by the addition of certain chemicals in the beater, surface treatments in chemical baths, or by the printing of an allover design on the surface by means of inks sensitive to water, soap, chemicals, bleach, or erasure.

Supercalendered Paper. Used largely for letterpress printing to reproduce halftones up to 133 screen, these papers reproduce wood engravings with great crispness of line, while their whiteness adds to the beauty of the printing. Supercalendered paper is easy to fold.

Although its finish is glossy, supercalendered stock is not coated. It is made with the same materials as machine-finish papers, but is pressed through metal rolls under great pressure at high speed.

Weight of these papers ranges from 50 to 100 pounds, and their basic size is 25 × 38 inches.

ENVELOPES

A wide variety of standard envelope sizes is available, each made in many types of paper, such as Kraft, manila, white wove, and bond, and each tested for tensile strength, folding qualities, color, printing surface, and texture.

Gumming. Since different stocks show different reactions to the same gum, varying types of adhesives are used. Each paper has its special type of seal.

Packing. Envelopes stand up best when packed in set-up boxes, and shipped to their destination in corrugated cartons.

SOME PAPER TERMS

Basis Weight. This is the weight of a ream of a given grade of paper in the basic size of that grade.

Beater. (1) A beater is a tank or tub with a partition or midfeather in which a heavy roll revolves against a bedplate. Both roll and bedplate may contain horizontal metal bars set on edge. When pulp or waste paper is put into the tub and water is added, the mass is beaten between the roll and the bedplate thereby freeing the fibers for further processing. Fillers, dyes, and sizing materials may be added to the beater and mixed with the paper stock during the beating process. (2) The term "beater" is also used when referring to a maple stick used by sheet and plate cutters to reach into the machine after full sheets have been jogged and inserted; by using the stick to beat the pile air can be removed from the far edges of lifts without endangering the hands or arms of the workers.

Book Paper. Book papers possess qualities rendering them desirable for book and fine magazine work. Rag, selected waste paper, and mechanical or chemical wood pulps are the most commonly used ingredients of book papers. Their principal finishes are antique, machine, English, and eggshell. The basic size is 25 × 38.

Cameo Paper. Cameo is coated paper with a dull, smooth finish. It is used with double-tone inks and where soft printing effects are desired.

Case Lot. The term is general, but in the paper trade it is known as a quantity of 500 to 600 pounds. It also denotes a quantity of flat paper usually packaged in a carton or box.

Casein. An adhesive used in the manufacture of coated papers, casein is a protein obtained from milk. It is also used in sizing paper.

Clay Finish. Clay finish is a very smooth-surfaced paper; the finish is obtained by filling the surface pores of the paper with fine clay.

Coarse Papers. Papers made for such purposes as wrappings, tags, towels, gummed tape are called coarse papers. The term is used to distinguish paper for these products from writing, bond, ledger, book, cover, and other fine papers.

Cockle Finish. This is a paper with irregular surface ripples popular in some grades of writing paper. It is caused by shrinkage under little or no tension during drying.

Commercial Envelope. The oblong envelope usually employed in business is called "commercial." It is available in sizes from $3\frac{1}{16} \times 5\frac{1}{2}$ to $3\frac{5}{8} \times 6\frac{1}{2}$ inches.

Crackle. This is a quality, highly desired in good paper, which causes it to make a crisp, crackling sound when handled.

Deckle Edge. The irregular or feathery edge of a sheet of paper is called "deckle edge." It may be caused by means of a jet of air or water, or by contact of the pulp with the deckle straps in a papermaking machine. In handmade papers which are made in a mold, all four edges are deckled. Imitation deckle edges may be obtained on a dry sheet of paper by tearing, cutting with a special knife, sand-blasting, or sawing, etc.

Digester. A digester is a vessel in which rags, pulpwood, straw, or other papermaking materials are mixed with the proper chemicals and heated under pressure for the production of wood pulp. A sulfite digester is a steel shell with a special lining which resists the action of the cooking chemicals. Digesters are equipped to permit papermaking materials and the cooking liquor to enter, pulp and waste liquors to be discharged, and temperature and pressure to be controlled.

Eggshell Finish. The texture of this paper resembles the surface of an eggshell. It is produced on wet presses by special felts which create an irregular pattern of rounded hills and valleys.

Embossed. Paper containing a raised or depressed design is "embossed." The design is pressed into the paper by means of an engraved steel roll or plate and soft material, such as paper or cotton. The paper is pressed between these or between two strong coarse fabrics. Embossing creates highly decorative effects, and is thus much in demand for fine books and

Flong. A sheet of absorbent paperboard that consists of layers of tissue on a sheet of heavier paper is called "flong." When this material is impressed and dried it may be used as a mold or a matrix for casting stereotypes. A wet flong usually consists of a sheet of about 100-pound white blotter (19 × 24 × 500), one sheet of 40-pound blotter, and four sheets of 6-pound white tissue (24 × 36 × 480).

Glazed. Glazed paper possesses a high gloss which is applied by a friction calender, plater, Yankee drier, or some similar method. Paper may be glazed while it is being manufactured, or after it is produced.

Hard Paper. Hard paper has a smooth, hard surface, such as some writing papers. Because of its sizing, it requires special ink and a heavier impression for successful printing.

Hollander. The hollander is the beating machine in a paper mill, or the rag washing machine.

Ivory Finish. Ivory finish is obtained by calendering the paper through beeswax-coated rolls.

Japan Papers. These strong, long-fibered papers are made in imitation of the old imperial vellum and have an irregular appearance. They give a beautiful mottled effect. The papers are used for offset printing, novelties, greeting cards, etc.

Jute Pulp. Jute pulp is produced from jute products, such as burlap. As it produces paper of excellent strength and durability, it is used in the manufacture of wrapping paper, tag stock, and folders.

Laid Mark. This is the faint, but clear mark produced by use of the dandy roll in papermaking. The more pronounced pattern is about 1 inch apart, running with the grain and parallel to the backbone of the book. The less pronounced design is at right angles to the other and fainter, about $\frac{1}{16}$ inch apart. (See Fig. 5–5, p. 116.)

Laminated. When paper or board is brought to a desired thickness or given some particular surface by joining two or more webs or sheets, it is laminated.

Lawn Finish. This is a smooth, linenlike finish, produced under heavy pressure on a plater press. It differs from a linen finish in that the paper is conditioned to increase the moisture content before plating. The finish is especially noticeable if the paper is held to the light. It is used especially with papeteries.

Lignin. Lignin is the resinous material in pulp wood, which is noncellulose and which is removed in chemical pulpmaking.

Loading Agents. Fillers, or loading agents, are added to pulps during beating to fill the spaces between fibers and give the paper solidity and a smooth surface. China clay or kaolin is the usual filler but it tends to soften the paper. Satin white is a precipitated mixture of calcium sulfate and alumina; it produces less softening of the paper, but is harder to incorporate in the paper pulp because of its high specific gravity. Asbestine, agalite, or powdered talc are forms of magnesium silicate and are used as fillers for imitation on art papers. Calcium carbonate is sometimes found in cheap magazine papers; chalk is used in cigarette papers. Other loading agents are gypsum or terra alba, pearl hardening or crown filler, and aniline.

Manifolding Paper. Manifolding paper is covered on one side with carbon black, which enables many duplicate copies to be produced with one writing, especially on the typewriter; it is known as carbon paper. It is generally strong and thin.

Mill Finish. A mill finish is obtained on paper by calendering.

Pebble Finish. This pattern is obtained by passing the sheet between steel rolls containing the desired pattern, under high pressure.

Plate-finished Paper. This is paper that has been processed by being placed between plates of zinc or copper. Finishes obtainable by this method are generally smooth, but may also be linen, ripple, or coarse.

Ply. (1) "Ply" refers to one of the separate webs or piles composing the sheets made on a multicylinder paper machine. Each cylinder adds one ply, and they are pressed one upon the other, adhering firmly together when dry. (2) The term also is used for sheets pasted together to form a solid fiber or pasted board of the desired thickness.

Quire. A quire is one twentieth of a ream. Twenty-four sheets in coarse papers, and twenty-five in the finer grades, make a quire. Among the former may be reckoned wrapping papers, and tissues; among the latter, book and writing papers.

Ream. A ream is a quantity of 500 sheets of paper. In some isolated cases, a few sheets less or more than 500 is also a ream.

Right Side of Paper. In handmade paper, the wire side is the right side; in machine-made paper, the felt side; the side of the sheet from which the watermark may be read correctly is the right side.

Ripple Finish. This finish is obtained by plating paper between sheets of sulfite pulp with crushed formation. On paper made by this process, the indentations are darker than the higher spots, and the resulting

finish is glossy but rough. This finish may also be made from a continuous web of paper by passing it over a steel roll embossed with a ripple surface. (See Appendix I, D.)

Sizing. (1) Sizing is the resistance of paper to penetration by liquids or vapors, especially water. The term is also incorrectly applied to changes in the characteristics of a paper which may result from impregnation of the sheet with starch, glue, etc. (2) Sizing consists of materials which are added to the furnish for paper or board (or applied to them) in order to increase their resistance to penetration by liquids or to supply certain other desirable qualities such as high printability or a good writing surface.

Tooth. This characteristic enables paper to take ink easily. It refers to the grain of various papers, resulting from either the wove marks of wire (on the underside) or from small depressions between the fibers on the surface. The term is usually applied to drawing papers and others of low finish, a characteristic of handmade papers.

Tub-sized. Paper or board impregnated with sizing material such as starch or glue, in a tub or vat, has been tub-sized.

Watermark in Paper. A watermark is made either by the dandy roll or artificially, by impressing the paper web while it is still moist. Better grades of paper, such as rag paper, use the former method, while cheaper grades (sulfite) substitute the artificial method. (See Fig. 5–6, p. 116.)

Window Envelope. This is an envelope with an opening in front through which the address, as written on the enclosed letter, may be read. The window is usually covered or closed with transparent paper. These envelopes are available in sizes from $3\frac{1}{2} \times 6$ to $5 \times 11\frac{1}{2}$ inches.

With the Grain. This term means parallel to the direction of most of the fibers or folding paper in this direction.

6

INK

Paper and ink are the principal components of any printed page. Since the requirements and uses of printed materials are many, both paper and ink are manufactured in a great variety of types, qualities, and colors for easy adaptation to the endless number of functions they must perform and to each of the printing processes.

ESSENTIAL PROPERTIES

The final result of the union of ink and paper is the formation of a picture or message conveyed to the reader by virtue of the contrast in color between the two. Therefore ink must possess three intrinsic qualities (1); color; (2) capability of transference from press to paper; and (3) capability of remaining on paper when printed. Pigment, vehicle, and binder are the most common terms used to describe these necessary elements of ink.

1. Pigment. The pigment is the material that gives the ink its color. It may be powdery in its original form, derived from such sources as minerals and metals.

2. Vehicle. In order to be easily handled on a press, distributed rapidly and evenly on a press form, and transferred therefrom to the paper or printing surface, the pigment is mixed in a solvent or vehicle, such as linseed oil, to make it fluid.

3. Binder. In order that the fluid remain on the paper yet not smudge, it must be capable of drying in a short period of time. For this purpose, driers and drying oils—such as dehydrated castor oil, styrenated oils, and cobalt, manganese, and lead compounds—are added to the pigment and vehicle.

PRINTING REQUIREMENTS

Letterpress. Only the raised portions of the letterpress plate should accept ink. A typical plate may have 17,689 tiny raised dots per square inch and each dot is surrounded by a low or nonprinting area. The low areas must not fill in with ink. For this reason, letterpress ink is fairly tacky. It is applied to the surface of the plate by means of revolving rollers that deposit a layer of ink on top of the many small dots. The ink must not run into the valleys, otherwise the plate will print as a solid and tones and details will be obscured.

Lithography. The basic principle of lithographic printing is that grease and water tend to repel each other. Since the lithographic plate is alternately watered and inked, the ink must be of a greasy nature that will not mix with the moisture on the surface of the plate. It is also important that lithographic inks, black or colors, be strong in pigment. The inked image is transferred from the plate to a transfer or offset cylinder and thence to the paper. This indirect application of the ink tends to lessen the amount of ink deposited on the paper; in order to get full strength, whatever ink is deposited must be strong in color. As an examination of jobs printed by lithography will reveal, manufacturers of inks have met this challenge successfully.

Gravure. In this process, the ink must fill up the tiny wells in the plate. There may be 40,000 such wells to the square inch. The reproduction of tone values and of details in this process depends upon the amount of ink deposited in any area and not upon the size of the dots. The deeper wells hold more ink. The ink must be very fluid and it is translucent. Its fluidity permits it to fill each well; shallow wells do not hold much translucent ink and therefore, when printed upon paper, permit white paper to reflect back through the film of ink, visually diluting the ink so that the eye sees a light gray. Deep wells hold a lot of ink, deposit a lot on the paper, and thus produce shadow areas because little white paper reflects through the ink.

Gravure inks contain a highly volatile solvent or vehicle. The vehicle evaporates almost instantly leaving a dry film on the paper. This is highly desirable for long-run, high-speed printing. The great volatility of the ink makes it necessary to keep the ink in an enclosed fountain on the press.

Aniline. A form of letterpress printing, the aniline process is widely used for printing on cellophane, bags, and food wrappers. For this reason, the ink must be odorless. The process is so named because the first inks used aniline dyes for pigments. Although dyestuff inks are still in use, the process also uses 100 percent pigment inks that are light-fast, resistant to

moisture and food fats, nonbleeding on cellophane, and highly opaque (for perfect coverage on acetate). Aniline inks have resin-alcohol vehicles that facilitate rapid drying. They can be printed by rubber plates which are used for bag and food-wrapper printing. Since aniline inks are used on a wide variety of stocks (such as Kraft or wrapping paper, acetate, sulfite, absorbent papers, and metallic sheets), they must be specially formulated for the job at hand.

Silk Screen. Depending upon the surface to be printed and the effect to be produced, a wide variety of inks and paints can be used in the silk-screen process. The kinds of printing media used include 100-percent opaque water colors, transparent oil colors, gloss colors, dull colors, tempera, water colors, metallic paints, dyes, varnish, glue, rubber cement, in fact, any medium of a free-flowing consistency. Because the process can use paints, it is capable of producing very bright color effects and printing opaque light colors over dark colors or stock. Adhesive paints, which stay sticky for a while on the paper or printed material, can be used. The printed piece can then be sprayed or sprinkled with sand, tinsel, or some textural material that will adhere to the ink.

Collotype. A stiff, tacky ink is used with collotype. This may tend to offset on the backs of adjacent sheets, and slip-sheeting is often necessary when both sides of the sheet must be kept clean.

DRYING METHODS

Perhaps more strides have been taken in recent years to speed up the drying of printed material than in any other phase of ink research. Drying is important to the quality of the job; it should not smear on adjacent sheets or when touched by moist hands. Instant drying is a must for long-run high-speed work when millions of publications or catalogs must be printed on both sides in full color, and then folded, trimmed, stitched, wrapped, and mailed in one day. There are a number of different ways of drying inks, as discussed in the following paragraphs.

Oxidation. The linseed vehicle inks used in much letterpress and lithographic printing dry by oxidation and subsequent solidification of the vehicle. In former years, these inks did not dry rapidly and the printed sheets had to be handled and bound before they were completely dry. To prevent spoiling the printed job, the sheets were sprayed, as they were delivered by the press. The spray did not dry the ink into the sheet but helped prevent smudging or offsetting so the sheets could dry while being handled. Some jobs required slip-sheeting, an expensive and time-consuming operation requiring the insertion of an unprinted sheet of paper between each printed sheet and subsequent removal of the slip sheets.

This procedure is obviously too costly and too slow to be used on long-run high-speed publications, and other means of drying the sheets had to be developed.

To dry printed material rapidly, the printed web is passed through a gas flame and then over chilled rollers. Care must be taken to avoid burning or scorching. Coming into greater use is a steam drum around which the printed web travels. The application of heat between 300 to 600 degrees Fahrenheit causes the vehicle to solidify almost instantly.

These units are installed at the end of the press and are used after all colors are printed on both sides of the traveling web. This means that the second and additional colors print on top of the first and each other while still wet. This is known as wet printing. Inks must be specially formulated so that they will trap properly; that is, the ink must be of such consistency that it will stay on the paper and hold the next ink as well, and not be pulled off the paper by subsequent ink impressions. When proofs of plates to be used in a wet-printing job are being pulled, they should be pulled with the same inks, in the same rotation as will be used on the press run, and, if possible, on a press equipped to simulate wet printing as nearly as possible.

Solvent Evaporation. In this method of drying, the solvent in the ink evaporates and leaves behind a dry pigment and binder. This drying principle is widely used in gravure and aniline printing. The alcohol vehicle of aniline inks and the petroleum solvents of gravure inks have low boiling points and consequently are easily dried. In aniline printing, the sheet is passed under a gas flame or a bank of infrared lights These hasten evaporation of the solvent and cause almost instant drying of the ink. In gravure printing, the web is passed over a steam drum or through a 10-foot warm-air drying tunnel. The sheets are dried in less than a second. Large gravure printers have solvent recovery systems that capture the evaporated solvent and enable it to be reused.

Selective Precipitation. The solid resin part of the vehicle is unstable in the presence of water or steam. Drying is accomplished by spraying the printed sheet with water or steam, causing the resin to come out of the solvent and the rest of the solvent to be absorbed into the paper. This method is usually confined to jobs having no halftones and where top quality is not essential.

Absorption. This is typical of newspaper printing and really is not drying. The ink and paper are of such a nature that, instead of the ink staying on the surface of the paper, much of it is absorbed by the inner fibers of the paper. This kind of drying is obviously unsatisfactory for quality work, as the still-damp ink smudges off when the paper is handled.

SPECIAL PURPOSE INKS

In variety, the ink manufacturer's product has increased to meet almost every conceivable requirement set forth by the user. It should be remembered, however, that some properties of inks are obtained through the sacrifice of others. For example, to obtain a yellow ink that will not fade in sunlight, it may be necessary to use a pigment that will yield a less perfect color than an ink that will fade.

In general, the buyer of printing should leave the purchasing and specifying of inks to the printer who is experienced in buying and handling inks. However, a knowledge of what kinds of inks are made will enable the buyer of printing to create and design a promotion piece or a package that can take advantage of the functional properties of ink. For that reason the reader's attention is called to the following special purpose inks: slow-drying, rapid-drying, instant-drying; inks for soft surfaces, for hard surfaces, for plastics, wood, leather, cloth, and almost any other material in existence; thin, watery inks and thick, tacky inks; translucent inks, opaque inks; inks that will bleach and light-fast inks; dull inks, glossy inks; odorless inks and specially scented and perfumed inks; black inks and a tremendous variety of colored inks; ink for dry printing, for wet printing, and for every process of printing; inks that are invisible and inks that can be seen at night without any obvious means of illumination; nonscratch and nonsmudge inks; inks with resistance to such things as alcohol, alkalies, acids, grease, wax, butter, oil, soap, sulfur, brine, etc.; conventional colors, pastels, and metallics; inks that change color upon application of water or heat; inks that change color as atmospheric pressure changes, and inks that dry with a two-color effect.

BLACK AND COLORED INKS

Black ink is taken for granted by too many buyers of printing. Actually there are a great many different kinds of black inks that produce a variety of subtly different effects as they vary in degree of gloss, kind of texture, and exact shade—such as blue-black, brown-black, etc. Where special effects are desired, a study of the sample books of some of the ink companies is worth while.

Ink books also reveal the great variety of colored ink that is available for two-color jobs. The production man should have access to these books.

In four-color work, it is often necessary that the reproduction be a faithful color match of a product, package, scene, etc. When the printing of the job can be controlled, as in the case of a catalog, leaflet, folder, or brochure, for example, the product or article to be faithfully reproduced should be shown to the printer who can select the set of process inks most suited for the job. Plates can then be made for and proved with these inks.

7

PRINTING

A BRIEF HISTORY

Even the primitive art of printing did not spring into being overnight. Like most inventions, it came from years of experiment. We know that in China and Japan jade, ivory, and metal seals and carved blocks of wood were inked and stamped on paper as early as the fifth century. A thousand years later, metal type is said to have been used in Korea.

It does not appear, however, that the western world learned printing from the Orient. The development there seems to have been distinct. Wood blocks were first used for printing pictures. Then a block was made for each page of a book, carrying both words and pictures. Finally, between the years 1440 and 1450, movable metal types were made from molds, the latter date being usually accepted as that in which the invention of printing was completed.

Just who invented movable type has also been a matter of dispute. The Netherlands claim it was by Lourens Janszoon Coster, of Haarlem. But stronger evidence seems to support Johann Gutenberg of Mainz, Germany, and he is usually credited with the invention.

Probably the earliest type-printed book is the famous Gutenberg Bible, printed between 1453 and 1456. Printing spread rapidly from Germany to Italy, France, the Netherlands, and England. By 1500 many establishments were turning out books, and their number steadily increased during the sixteenth, seventeenth, and eighteenth centuries.

Famous names are associated with these early years, as men made new advances in producing different faces of type and using them expertly —Johann Fust, Peter Schoeffer, and Johannes Froben in Germany; Nicolas Jenson and Aldus Manutius in Italy; Henri Estienne and Ambroise Didot in France; Bonaventure Elzevir in the Netherlands; William Cax-

ton in England; and many others. In the Americas, the first printing was done in the City of Mexico about 1539, and 100 years later a press was set up in Cambridge, Massachusetts.

Gutenberg and his successors for over 100 years used crude hand presses of wood. The "form" of type was inked and laid on the press "bed" of wood or stone. Then a sheet of paper was laid over the form and a wooden "platen" was lowered down and pressed onto the paper by means of a wooden screw which was turned by hand. A "blanket" of cloth was placed between the paper and the platen to soften the impression. For every sheet printed, the platen had to be screwed down and up again, and the form taken out and inked over. Inking was done with what were called "ink balls."

Improvements in the printing process were very slow in coming. About 1620, a Dutch printer, William Blaeu, devised a way of rolling the bed in and out under the platen, and in 1800 an Englishman, the Earl of Stanhope, made a complete press of cast iron. From these early changes in the primitive methods of printing, many innovations began to modernize the printing processes.

The use of a cylinder instead of the old, flat platen to press down the paper; new ink—a combination of glue and molasses—answered the need for cylinder ink; the discovery of the ink roller; the flat-bed cylinder press; the combination press to print both sides of the paper at once; development of the two-, three-, and four-color processes—these and many more discoveries revolutionized printing.

In 1846, Richard Hoe of New York patented the first rotary press, in which the type was placed on revolving cylinders; and in 1871 he invented what is known as the Hoe Web perfecting press. These presses print both sides of a continuous web of paper, which unwinds from a roll, and delivers folded sheets. The improvement of the rotary press and the combination of presses into great multiple units have made possible the amazing rapidity with which the newspapers of the present day are made. Printing has truly become a complex and fascinating art.

There are three distinctly different principles involved in the processes that produce the bulk of the commercial, book, and publication printing of today. (See App. I, B, D, E, H, and H-1.)

Letterpress printing is done from the raised portions of relief plates. Lithography is done from chemically treated flat plates. Gravure is done from lowered areas of intaglio plates. The diagrams and captions that immediately follow serve to explain the basic principles of each. Later in the chapter is a detailed description of each of these processes as well as of screenless printing—known variously as collotype or photogelatin—and of silk-screen printing.

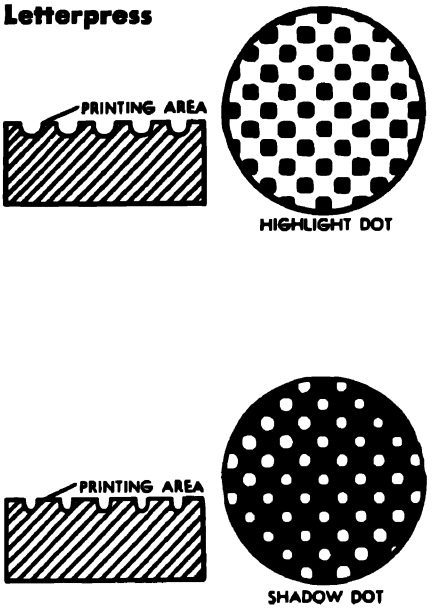


Fig. 7–1. Letterpress. High (relief) areas of the plate receive ink and transfer it to paper. Tone copy is screened and the image on the metal plate becomes a series of dots that vary in size and shape. Space between the dots is etched down by acid. The dots remain in relief, take ink, and print. There are the same number of dots per square inch in any area of a given plate, highlight, shadow, or middletone. The dots vary in size. In light areas, the dots are small, and therefore deposit little ink, leaving much exposed white paper between the dots. The resultant image is a blend of little black ink and much white paper—a light gray. In shadow areas, the dots are large, the space between them small, and the image is dark gray to the eye. Finer screens reproduce more detail. Any screen is capable of producing a full tonal range.

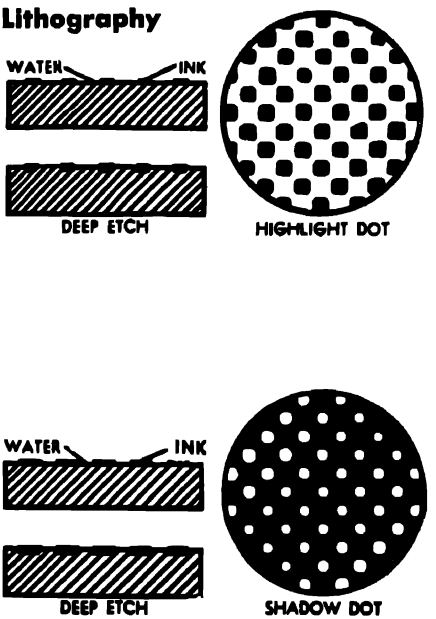


Fig. 7–2. Lithography. Printing is from a flat surface which has been so treated that its image area is greasy and has an affinity for ink and its nonimage area has a surface tension that permits it to retain moisture. On the press, the plate is moistened, and the greasy area repels water. The plate is inked, the ink adhering to the greasy area but being repelled by the moistened area; the plate then transfers the inked image to the rubber offset blanket, which in turn transfers it to the paper. The screen used in photographing tone copy is like that used in making photoengravings for letterpress. Dots of varying size and shape are produced. The eye blends the black dots and white paper and sees a number of gray values that seem to blend into each other.

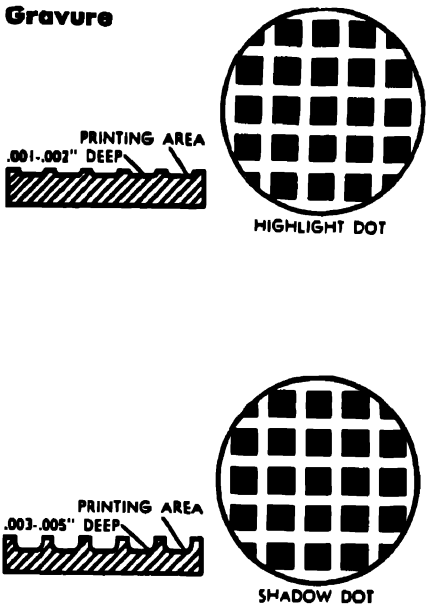


Fig. 7–3. Gravure. Lowered portions (wells) of the plate hold the ink and print. Dots in conventional gravure are of the same size, shape, and number per square inch in the highlight and shadow areas. The tone is controlled by varying well depths. Deeper wells in shadow areas hold more ink, print more clearly. Gravure uses a finer screen than letterpress; therefore, the screen pattern is not obvious to the naked eye. The tendency of the ink to spread on the surface of the paper further obliterates the screen and blends tones. Excess ink is scraped off by the doctor blade. In the Dultgen-news Halftone Method, a special, reverse, halftone screened positive is printed on carbon tissue and the tone is controlled both by the depth of the ink wells, as well as by the size of the tone dots themselves.

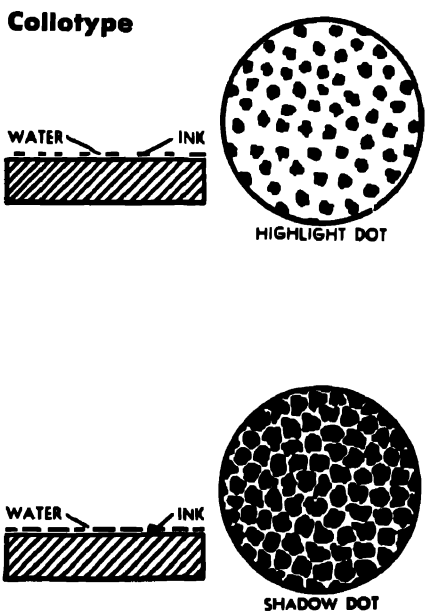


Fig. 7–4. Collotype employes no screen. Gelatin colloids form the only pattern in the reproduction, a fine, almost invisible grain. As in lithography, the plate is practically a plane surface, the printing areas being ink receptive, while nonprinting areas are ink repellent. The plate is dampened once but inked for each impression. Chemical treatment of gelatin, plus the effect upon it of light used in photographic printing, creates varying degrees of hardness in it. Where extremely soft, it will accept water, which rejects ink. Varying degrees of hardness between these extremes cause corresponding variations in the amount of water or ink that is accepted or repelled by the plate.

LETTERPRESS PRESSES

Letterpress work may be done on any one of a number of presses in the following four major groups.

1. Platen press
2. Flat-bed (cylinder) presses
3. Rotary presses
4. Web (newspaper) presses

Platen Press. The platen press obtains an impression by bringing two flat surfaces together. The form is placed in a vertical position against the press bed and held securely by a clamp.

In the clamshell type, the platen rocks against the form; in the sliding platen or universal type of platen press, the platen is first put in a position parallel to the bed, and then drawn against it, so that the impression is delivered on the sheet after the flat surface (the platen) has received it.

On the platen are clamped a pressboard and paper packing over which is the tympan, a sheet of heavy oiled manila paper. The type and thickness of the packing regulate the amount and nature of the impression (see Fig. 7–5).

Because the versatile platen press can regulate this squeeze, it may be

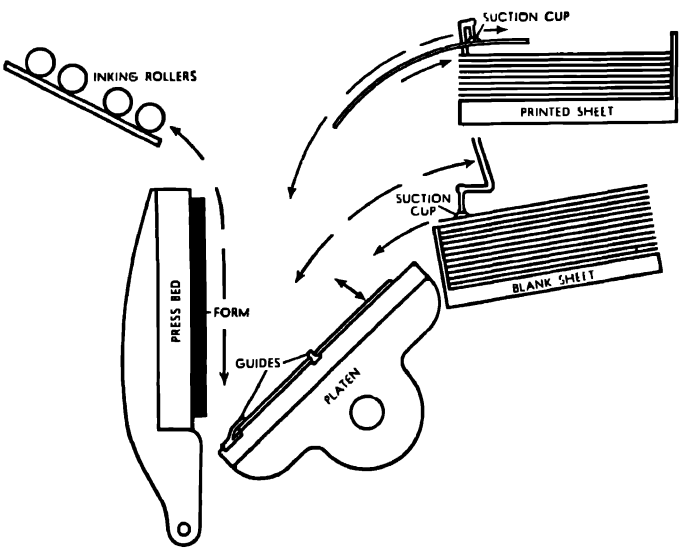


Fig. 7–5. Automatic platen. The clamp holds form in vertical position. The platen rocks to a position parallel with the bed as the bed moves forward toward the platen. The paper on the platen is pressed against the whole form at once. The paper is hand- or automatic-fed against the guides on the platen, which moves up and tips back to facilitate feeding. The printed sheet is removed either by hand or automatically at the time the new sheet is fed. The automatic platen press illustrated above has mechanical feed and delivery. The platen press is of considerable advantage when stock is too heavy to bend around a cylinder. Among the many uses of this press are printing, embossing, stamping, die-cutting, leaf-laying, and creasing. The rated maximum speed is approximately 2500–3500 per hour.

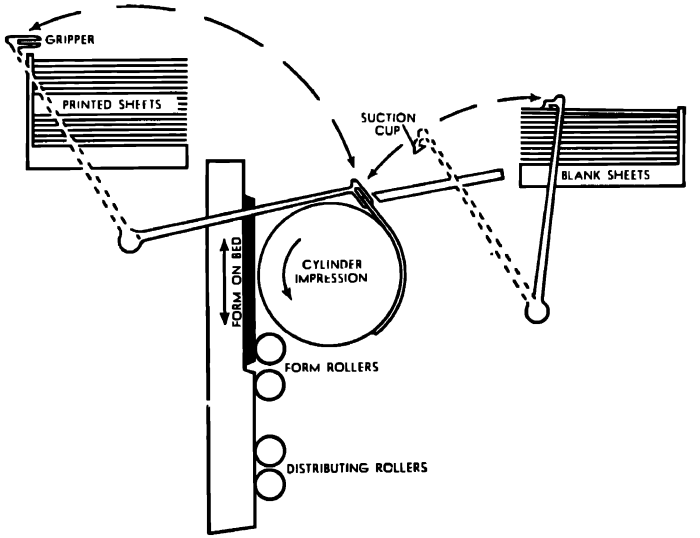


Fig. 7–6. Vertical cylinder. A small, high-speed cylinder press in which a flat form, in chase or on base, is locked vertically on the press, rather than horizontally as with other cylinder presses. The form moves as the paper revolving on cylinder is in contact with it. The vertical's rated maximum speed is 3600–5000 per hour. Letterpress inking: Inking on all letterpress equipment follows the same principle. Ink is transferred via rollers from a trough or fountain to the form on the bed or to plates on the plate cylinder. The rollers assure complete and even distribution of the ink and vary in number from one press model to another.

used for anything from simple one-color work to fine-process color work on material varying from the thinnest paper stock to heavy cardboard. The presses come in various sizes—the larger and stronger for embossing, stamping, die cutting, creasing, and for metallic leaf laying. They will print from any raised surface, such as type, halftones, line cuts, electros, stereotypes, woodcuts, wood blocks, rubber plates, and linoleum blocks.

Flat-bed Press. The flat-bed cylinder press makes the printed impression by carrying the paper, which is held to the cylinder by grippers, between the press and the form. The bed and cylinder bearers make a mechanical squeeze contact which can be varied within narrow limits by control of the packing thickness on the surface of the cylinder (see Fig. 7–6).

The form on a two-revolution flat-bed cylinder press is locked on a perfectly flat bed, and the impression is obtained by a large cylinder which makes two revolutions per impression. During the first revolution, it prints; during the second, it rises to remove the printed sheet and on the return stroke of the bed, clears the form. In the single revolution, or drum-cylinder press, the paper fits only half way around the cylinder, whereas on the two-revolution press the paper almost completely encircles

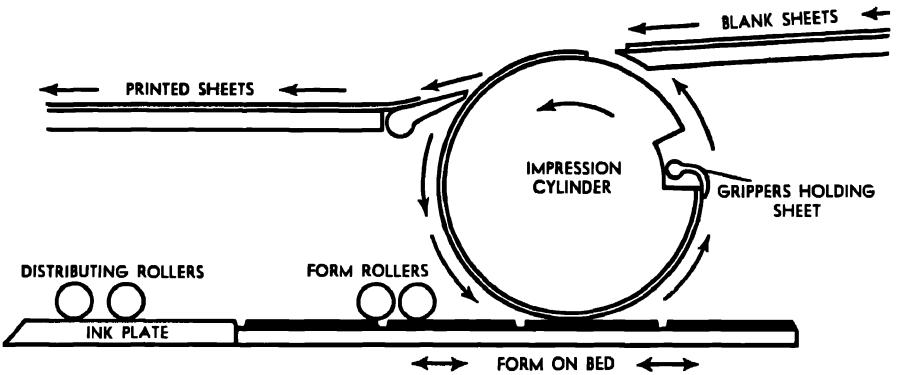


Fig. 7–7. Cylinder. The form is locked on the flat bed of the press, the impression being against a large cylinder. The bed travels forward and backward, the cylinder making two revolutions to one impression. The impression cylinder contacts the form while revolving. The paper is held to the cylinder by grippers and, in traveling around, it is pressed against the form which has already been inked.

the cylinder. The drum cylinder makes the impression on a half revolution, so that the side of the cylinder opposite to the one which carries the paper is of a slightly smaller size. This allows the type form to return to its original position without touching the drum.

A two-color cylinder press consists of two units, each with a bed, an impression cylinder, and a distributing mechanism. The paper goes through the press once in positive register and is printed in two colors. After the first color is printed, an intermediate cylinder removes the sheet from the first cylinder to the second, where it receives the second color. Before the grippers on the first cylinder release the sheet, the grippers on the transfer cylinder take hold of it. The same action is repeated on the second cylinder, which keeps the sheet in control during the entire process (see Fig. 7–8).

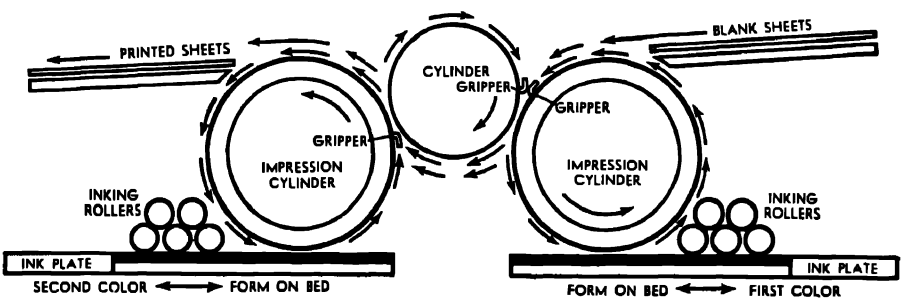


Fig. 7–8. Two-color cylinder. An intermediate cylinder transfers the paper to the second impression cylinder so that same side will be printed on. This press, like the one-color, prints from flat plates or type, uses either a chase with type and mounted plates or a base with unmounted plates, and is widely used in printing of two colors wet, and in four-color commercial printing.

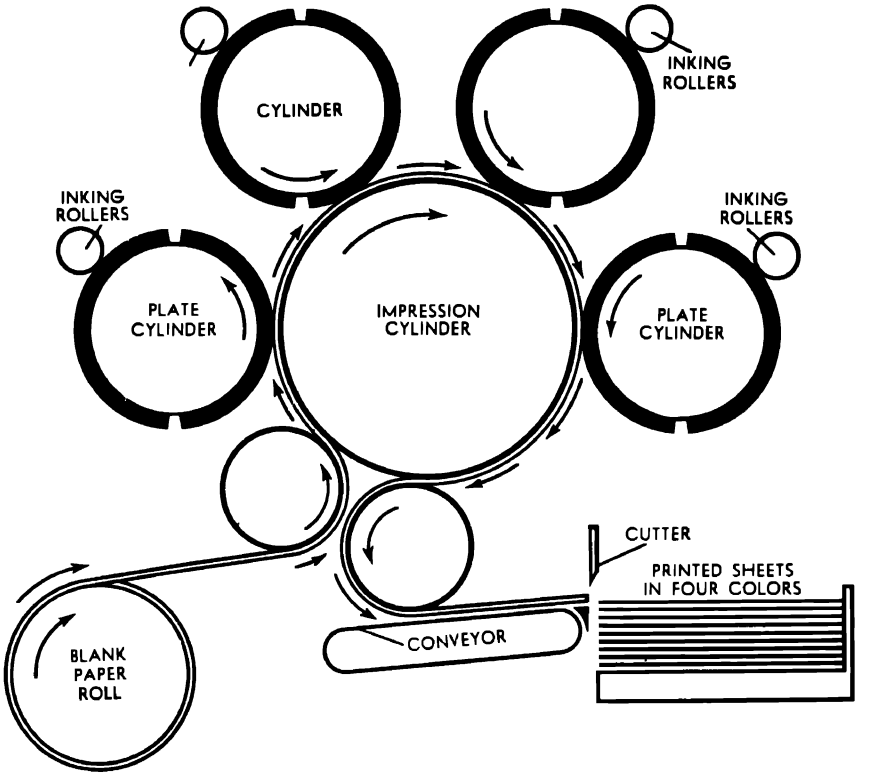
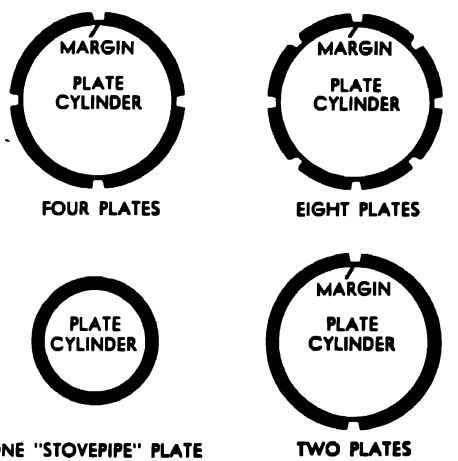


Fig. 7–9. Multicolor rotary. As in the rotary perfecting press, printing is done from curved plates, usually duplicates, wrapped around the plate cylinder. The paper can be fed in either sheet or roll form, and delivery can be roll-rewound or it can be slit into sheet form. Used for job and magazine printing in four colors, some of the multicolor rotary presses are made to print 5500 copies per hour. Sheet sizes range from a minimum of 28 × 29¼ to a maximum of 60 × 80.

Fig. 7–10. Rotary press plates. The "stovepipe" plate around the cylinder is a stereotype that is used for newspaper printing. The arrangement of two plates around the cylinder is usually for newspaper work also, and the plates employed are generally stereotypes. When three or more plates are locked on the cylinder, magazine, book, or job printing is being done and printing is customarily performed from curved electrotypes.



The perfecting flat-bed press is a double cylinder, similar in construction to the two-color press, but without a transfer cylinder. The sheets are moved from the first cylinder directly to the second, and turn over in the press. The perfecting flat-bed is designed to print one color on both sides of the sheet at one time, through the press. To prevent offset on the back of the printed sheet, an oil solution in a fountain, together with plush rollers, forms contact with the second cylinder tympan. This press takes paper from a tremendous roll, instead of using single flat sheets.

Rotary Press. Rotary presses are particularly effective for fine-register work at high speed, and for economy in long runs, such as newspapers. Only complete curved electrotypes or stereotypes can be used, cast paper size, two to each cylinder. In rotary-press work, the printed material, on curved plates, is carried on a revolving cylinder, while another revolving cylinder impresses the paper on the plate. Rotary presses are built for multicolor work, and by operating the cylinder in progression, any number of colors can be run. Each color has a separate cylinder and a series of grippers which transfer the paper from one cylinder to another (see Figs. 7–9 and 7–10).

The web perfecting rotary press is much more simple than the complicated mechanism it appears to be. Semicylindrical plates held by clips make up the printing surface on one side of the cylinder. To make

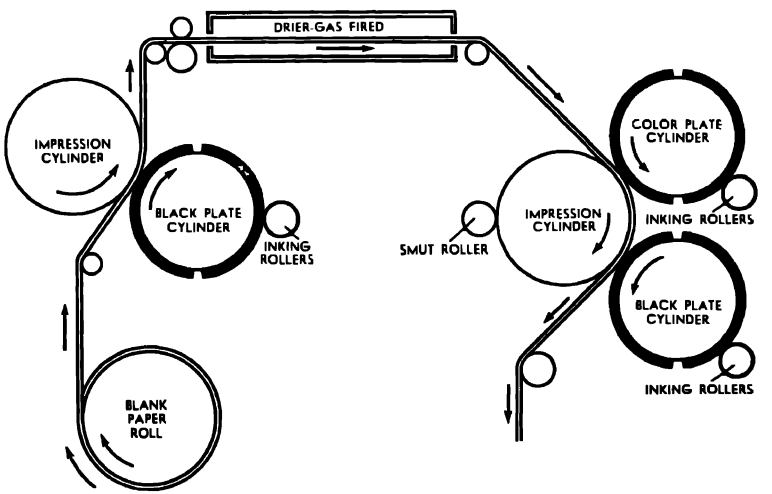


Fig. 7–11. Perfecting. This illustration pictures a typical magazine arrangement both web-fed and sheet-fed. Additional cylinders for additional colors are at either end. Other installations include (a) two colors first side, two colors back-up; (b) two colors first side, four colors back-up: and (c) instantaneous drying inks, four colors on the first side, four colors back-up. Special heaters are installed for each side of press.

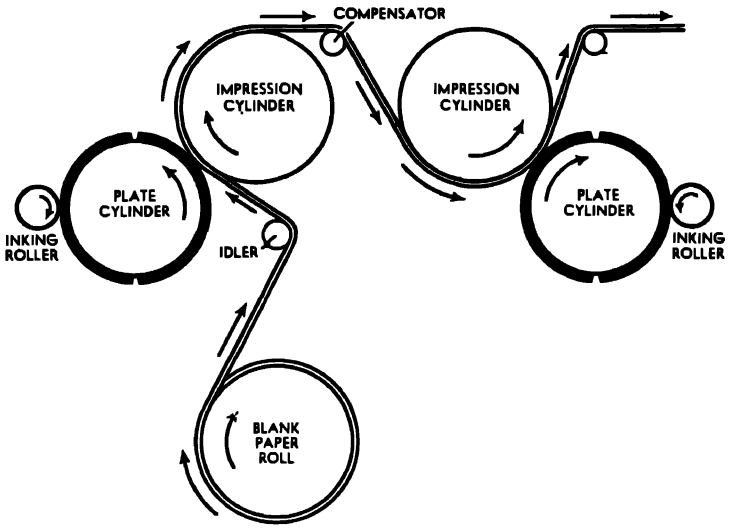


Fig. 7–12. Rotary perfecting. Printing is done from curved plates, usually duplicates, which are wrapped around the plate cylinders. Paper is fed in roll form. The rotary perfecting press prints on both sides of the web in one run. Delivery can be in rewound roll, sheets, folded signatures, and perforated, numbered, etc. Recently developed photoelectric device preserves hairline register by keeping web in line. Used widely for magazine and newspaper printing.

the impression, the paper is pressed against the printing surface by the opposite cylinder.

Web perfecting presses consist of a series of single presses combined into one multiple press and named for the number of units it contains, such as sextuple, etc. No matter what the number of units, the paper, which is fed from a roll, must be threaded through all the units so that all parts of a newspaper, for instance, will join together at the end to be folded into one single newspaper. Guide rollers, through which the paper is threaded, keep each section of paper in its proper units and away from other sections.

A four-unit press, four pages wide, known as an octuple rotary web press, can turn out 50,000 or more copies of a newspaper in an hour, or about 1500 feet per minute. As the paper goes through the press, a new device enables the beginning of one roll of paper to be attached to the end of another without slackening the speed.

LETTERPRESS PRESSWORK

An understanding of just what is involved in putting a form on a press and getting it to print properly will enable the production manager to plan his job more efficiently and to analyze his proofs more intelligently.

Lock-up. Often the letterpress form consists of a number of plates and many lines or slugs of type. These may have already been made up into page form but now require making up into a press form.

Depending upon the imposition, the pages will be laid out on a large level table, known as a stone, in the relative position in which they are to print. Furniture, less than type-high (i.e. wooden blocks used just for this purpose), is placed between and around the pages so as to make the whole form solid. Quoins (wedge-shaped pieces of metal) are placed around the pages and are tightened by means of a key until they squeeze every plate and piece of type in the form tightly into position.

The form is then hammered with a wooden block and mallet to push it down and to make its surface as uniformly level as possible. The whole form, having been locked inside a steel frame or chase, is then transported to the bed of the press and locked in position thereon. This is the outline of the procedure followed in flat-bed printing, using a chase. In flat-bed printing, all material must be type-high. Sometimes a base is used in place of the chase. Instead of being merely a frame like the chase, the base is a metal mounting unit of such height that an unblocked 11-point electrotype placed upon it will be type-high. In order to position the plates on a base, the beveled edges of the plates are fastened down by means of hooks that catch into holes or grooves in the base. When printing from a base, electrotypes are usually made of the type matter and original plates which must be electrotyped or backed up to the correct thickness. The latter procedure is inexpensive but cannot always be done. The printer's advice should be sought in this matter.

For printing from curved plates, as is done by many long-run newspapers, magazines, and catalogs, the curved plates are mounted on a grooved cylinder, much as the unblocked electros are mounted on the flat patent base. In supplying material to publications who print from curved plates, it is generally the custom to supply an unblocked original, electrotype, or duplicate original. The publication then makes the curved plate or plates as required.

Line-up. After the form is locked on the press, a few sheets are printed and sent back to the composing room for lining-up. A special glass-top table, with illumination from below and equipped with sliding rulers, is used to check the exact position of every page and insure that all margins, trim edges, bleed edges, etc., are precisely positioned. If they are off position, shifts are made on the form while it is on the press and a new proof is pulled. When the line-up of the sheet is finally correct, make-ready is started.

Make-ready. Theoretically, the surface of the printing form is absolutely level. Actually, there are always slight hills and valleys on it. Since printing takes place when the inked form contacts the paper and transfers the

ink to the paper, it is important that all printing areas touch the paper. When the first sheet is pulled, some areas may print well, and others may be very light. The pressman could increase the printing pressure but to do so would cause the dark-printing areas to punch through the paper. It is necessary for him to bring the entire form, area by area, to a perfect printing level. This is known as make-ready.

Make-ready is accomplished in several ways. When the printing on a whole plate is light, the back of the plate or its block can have a thin piece of paper pasted to it. This will raise the plate without affecting the rest of the form. When the whole form is light, sheets of paper can be wrapped around the impression cylinder of the press. It is around this cylinder that the paper travels. The cylinder presses the paper against the inked form. Although the cylinder is metal, the surface contains several layers of paper topped by a tough tympan sheet. The revolution of the impression cylinder is synchronized with the backward and forward motion of the press form so that every time the form and the cylinder are in contact, every spot on the cylinder contacts the identical corresponding portion of the form. Consequently, to make certain portions of the form print more darkly the pressman adds small pieces of tissue paper to the corresponding spot on the packing of the impression cylinder. This is painstaking, detailed work. It may consume many hours. Good make-ready is essential to fine letterpress printing. Once the form is made ready, the pressman adjusts the ink flow until the desired effect is achieved.

Register. Register is the precise positioning of each color plate in a set with respect to one another. Imperfect register causes such obvious printing blemishes as color streaks of red or yellow or blue on the edge of the picture, which blur the detail of the picture as a whole. Good printers have excellent equipment with which to assure register of the color plates, but their job is made easier and more assured of success if supplied with the best possible material. It is easier to register unblocked electros printing on a patent base than to work with blocked plates. Pressroom humidity should be controlled to prevent paper from shrinking or stretching between impressions.

Work-ups. Elements in a locked-up form occasionally work loose and rise in the form, accept ink from the inking rollers, and print. Alert pressmen can catch the resultant blemishes on the printed sheets, can stop the press, and can then hammer down the workups after only a few sheets have been spoiled.

Imposition. The arrangement of type pages on the printing sheet, especially important for book and booklet work, is called imposition. When the printed sheets are sent through the folding machines, they should

emerge as signatures with the pages in proper numerical sequence. This must be planned for in the imposition. Before the form is locked up, an imposition is obtained from the binder, complete with guide and gripper marks. The binder's trim allowance must be carefully checked, since the bindery's equipment may demand a special imposition. A variety of different impositions are possible in standard book work. The number of pages to be printed on the sheet and the number of pages in each of the signatures in the book determine the choice of imposition. The number of pages in each signature depends on the weight and finish of the paper and the total number of pages in the book. Signatures of 16 and 32 pages are usual in book work; sometimes they run up to 64 pages, or they may be as low as 8 pages. The relation of the page size to the sheet size determines the number of pages to the printed sheet. Impositions fall into four classes: sheetwise, work-and-turn, work-and-tumble, work-and-twist.

Sheetwise. A sheetwise imposition has the form printing on one side of a sheet backed up by another form.

Sheetwise forms are used where two forms are necessary to complete a job that is run on two sides. After one side of the sheet has been printed, the form is removed and the new one put on the press.

To mark layouts for sheetwise imposition, three right-angled folds are made and page 1 is marked in the lower right-hand corner of the folded sheet. Page 2 is marked on the back of that, and so on, until each sheet is numbered. When the nature of the work permits, it is advisable to run all forms sheetwise, as this saves about half of the folding time It is also wise to use this kind of run when there is an odd number of pages and when the ink is heavier on one side than it is on the other.

Impositions are not difficult to master on forms that run to four pages or to multiples of four: 8, 16, 32, 64, etc. Some difficulty may be encountered, however, in marking folio and folding sheets from 12, 20, 24, 40, and 48 pages. Parallel folds are simple but, where right-angled folding is required, there may be some difficulty, especially for 20- and 40-page forms, because this demands a shift of plates on the turn. This shift means that there must be extra flat cutting on the sheet and extra folding and inserting in the bindery, all of which adds up to extra cost.

Twelve-page forms with properly proportioned pages will work-and-tumble as a rule. Now available are 26 × 29 and 29 × 52 sheets made specially for 24- and 12-page books that will trim to 6 × 9. A 24-page form would have to work-and-tumble on this new-size sheet.

Because there is no more work in the folding operation on a job that folds up two or more sheets, a saving is possible. The necessity for extra plates, additional make-ready, and extra press for the gang printing in-

volved in doing up two or more sheets is not always compensated for by the saving in folding and cutting. Planning must be done with this in mind. If the finished book is not overly thick, it may be trimmed at the top and bottom, and the books cut apart with one motion, thus saving on stock.

Work-and-turn. For work-and-turn imposition, the sheet is turned end over end for backing up, so that the left side backs up the right of the same form, and the right backs the left. When cut in half, the sheet provides double the number of identical booklets or signature sheets. For certain jobs, work-and-turn is an economical method, but it is wise to consult the printer before employing it.

Work-and-turn printing refers to printing the sheet on both sides from one form. First one side receives half the total number of impressions, then the stock is turned over sideways from left to right and the run is completed. Usually the forms that print work-and-turn are imposed from the center so that the lowest folio on the signature is in the center of the outside margin, and not in the upper right-hand corner. When the job is to be machine-folded, it is doubly important to start the lowest folio correctly.

Work-and-tumble. This is an imposition where the sheet is flopped the short way instead of end over end, so that two copies of the pages are printed on it. For perfect register, it is absolutely essential that the stock on tumble forms be trimmed square on four sides, or that slitters be put on the back of the sheet.

Work-and-tumble sheets resemble work-and-turn in that they are run without any change in form, with both sides of the sheet printed from the same form. The difference lies in the fact that sheets that are to be tumbled are fed to the gripper by both ends of the stock, first top and then bottom. In preparation for work-and-tumble, the stock is squared by cutting before printing begins, which requires extra work in cutting, jogging, and adjusting the grippers on the press.

Work-and-twist. This is the imposition style for simultaneous printing of two forms on one side of a sheet. Instead of being turned, as in the other methods, the sheet is whirled around and printed again on the same side. This style is often used to print ruled sheets, printing down rules on one side and cross rules on the other. Because the ruled sheet is printed when the form is whirled, there are no problems regarding the joining of the proper rules.

TERMS AND REFERENCE

Format. A format is the over-all size and general style of a book—its face of type, quality of paper, and character of binding.

Form. The plates or type from which the sheet is printed is called the form.

Signature. A signature is a section of the book proper on which all the pages of that portion are printed. One sheet may contain more than one signature.

Folio. A folio is the page number.

Scoring. The creasing of heavy stock to facilitate folding is called scoring.

Tip. A tip is a sheet which is pasted into the book with the pasting edge running with the grain of the stock.

Wrap. A folded sheet that folds around another signature is called a wrap. The inner section is called the insert.

Printed Forms. In the language of the print shop, printed forms are known as: print one side, print work-and-turn, print work-and-tumble (or work-and-flop), print work-and-twist, print sheetwise, or print and back-up.

CHECKING PRINTING QUALITY

When checking printed sheets to be sure they are of the best possible quality, the printing buyer should first look for such major things as correctness of imposition, quality of make-ready, perfection of register, and absence of work-ups, as discussed above. Other defects that can spoil a job and that should be avoided are offsetting—i.e., the smearing of ink from one sheet to another; streaks on the printed sheet; too deep (or "punched-through") an impression of type on the sheet; grayness on part or on all of the sheet; uneven intensity of color or ink across the form; white or black specks on plates or type.

Any one of the following can cause offsetting: improper make-ready; overinking; unsuitable ink; static; overprinting; forced production. These can be avoided by good plates made from good copy; careful make-ready; good ink (cheap, grayish ink must be run too heavy for good results); static eliminators on the presses; avoidance of overprinting on dry colors; no rushing of jobs; nonoffset gun; and proper handling of all wet sheets. Also valuable in eliminating offset are: a heating unit and heat-set ink; an infrared lamp; a traveling offset roll; concentrated ink; a gas flame between colors; a 1-pound can lid of corn starch and an equal amount of turpentine added to every 5 pounds of ink; and cold-set ink.

Should streaks appear on the printed sheet, paper and press should

be checked. If streaks appear on the same spot repeatedly, the press is undoubtedly at fault. When streaks jump around to different parts of the sheet, the fault lies with the paper.

A job that prints gray all over may need an overlay on the make-ready. Any of the following may also be at fault: too-soft packing for adequate impression; too-thin ink; lack of solids or contrast in the engravings; paper from an unfinished lot. Should the grayness appear on every second, third, or fourth sheet, it is advisable to check with the paper mill. Several rolls of the paper may have been sheeted at the same time, and lack of uniformity in the rolls tends to cause lack of uniform impression from sheet to sheet. When the grayness appears only around one or two cuts, it may be because the cuts are worn or shallow or the blocks are not hard and flat enough. Fading grayness, from light to dark, along the sheet may be due to the fact that one portion of the sheet is getting more ink than another. In this case the ink must be checked.

Attempting to print an ordinary halftone sharp black by the addition of ink or make-ready should be avoided; the result will often be smudging or offset. The additional ink will fill up spaces between halftone dots and mottle the middle tones.

Since ink cannot be preset, the pressman is responsible for keeping an even flow of ink throughout the run. In ordinary letterpress work, the speed at which the rollers move tends to heat them slightly, causing the ink to thin in the fountain and therefore flow faster. Only a certain amount of ink can be absorbed by a given paper; if too much is applied, that not absorbed will smudge or rub. Hence it is inadvisable to print back to back.

Because of the interaction of wet-printing inks, alteration in the succession of colors in a run may require a change of shades in order to match the supplied proofs. Where two sets of combinations are desired, the fountain should be split on the press whenever possible so that, if several small pieces are run through at the same time, two colors can be produced with only one impression.

In three-color printing, economies can be effected by specifying the darkest color for type, outlines, and some solids; this will eliminate the need for a black plate and make excellent color reproduction possible through the use of all three primary colors: red, yellow, blue.

Before okaying proofs, it is wise to check to make sure that the amount of color on all the proofs is equal. If one plate with a lot of ink is removed on a press running 16 up and 4 deep, the three other plates in the same row may have less ink, and complications may result. In order to save the charge for holding the press, proofs may be checked in the pressroom. Whenever a printer holds his press for a client's okay of color, the client will subsequently be charged for it. When the color of the back-up does

not match the first printing, facing pages will appear alternately dark and light.

To prevent smudginess on the plates, the form must be examined and washed up at regular intervals by the pressman. In an overprint job, the first color should not be permitted to dry too hard. Printing a second color over the crystallized ink of a first color may result in mottling and offsetting. Ink that will remain open for a specific amount of time may be ordered from the ink supplier to meet special problems.

Advance Planning. Obviously, the printing buyer can simplify his own job by consulting with the printer while the job is still in the planning stages. The printer knows the capacity of his equipment and thus can eliminate some of the technical difficulties which might arise from improperly prepared copy and art, if his advice is sought when work is still in the drawing-board stage.

PLANNING PRINTING

A checklist should be devised to insure harmony and economy in the manufacture of printed materials. It should include paper stock, color, finish, shape, size, feel, color of ink, fold, design, and type face. Everything on this list should be thoroughly checked with the printer before making specifications. And to obviate all the guesswork in budgeting a job, discussions with the printer should also include the size, format, and total cost of the work. Each of the steps in the preparation and execution of a job should be scheduled and recorded right down to the final delivery date. Since each of the printing processes has its own peculiar advantages, it is necessary to remember and be familiar with the mechanical characteristics of all of them. Then the printing process can be chosen which is consistent with the specific requirements of the job. All standard printed supplies should be subject to frequent review through some method of perpetual inventory to eliminate expensive overtime on replacement orders. A continual check should be made on all items such as titles, headlines, contents, and covers. Delays, errors, and last minute changes may distort the cost of a job out of all proportion to the original estimate—and frequently through no fault of the printer.

Multiple-page printed pieces, such as booklets or catalogs, should be designed with full consideration of the limitations of the press and binding equipment. Efficient use of this mechanical equipment often can save both time and money.

The most economical sizes for the manufacture of booklets and catalogs are 8, 16, 32, 64, 96, or 128 pages. Multipage jobs designed to fit these specific number of pages usually afford standard-size cuts from standard sheets, without waste. Efficient production demands that regular

sizes of selected stock be used whenever possible. Although 12, 24, and 48 page booklets are often used, they must be planned more carefully.

When it is feasible, catalogs should be produced using the smallest number of pages. Very often, complete catalogs are produced and distributed in their entirety to all who might make some small use of the product. A study of consumer usage might reveal that there are several different groups of consumers for the product, each group interested in only a limited and specific number of applications. In cases like this, it would be wise to produce many smaller catalogs rather than one large one, of which the major portion would be wasted. Economies effected in this manner might boost sales by allowing greater coverage of all potential consumers without the enormous waste involved in sending out only a limited number of big, bulky books. Serial numbers, although often used on catalogs and booklets, are not considered good practice. Much more effective is a prominent date which indicates timeliness to the reader.

A sheet of eight pages with two parallel folds and the inside inserted into the center fold and stitched, lends itself to use as a self-cover. The second fold gives a double thickness to the front cover. Printing of this type of cover can be accomplished at the same time as the inside of the booklet and the cover can be cut off before the folding is done. Booklets designed in this manner also permit printing on six of the eight pages.

Bleed pages and double spreads do not lend themselves to indiscriminate use. The double spread usually will fall in the center of a signature, if it is printed from a single plate. Imposition, size of sheet, and other factors affect the best position of double spreads and bleed pages. To assure correct positions for these types of layouts, consultations with the printer are in order while the job is still in the rough dummy stage.

The printer's advice will also prove invaluable in regard to the placement of color pages throughout the book, pamphlet, or catalog. Great savings in time and money may be effected if the placement of two-color pages can be arranged so that they can be printed on one run through the press.

If final distribution is to be achieved through the mails, economies of time and money can be made by planning the page size of a job to fit a standard envelope size. The envelope should be considered a part of the entire printing job to take advantage of savings through the uses of stock sizes and weights.

When several jobs are being run, all of which require imprinting, the imprint spaces in which the dealer names will appear should all be in the same size and shape and in the same relative position. Adherence to this type of advance planning will eliminate special composition for

each folder. Once the form is locked up and on the press, it does not take much time to make a change. However, plans should be made to print large imprint runs while the folder is on the press for the original printing. Proper planning at this time saves later imprinting operations, while requiring that the press be stopped comparatively few times for all imprint changes.

HOW TO ASSURE BETTER REPRODUCTION OF NEWSPAPER ADVERTISEMENTS

Occasionally (and yet too often) the tear sheet of a newspaper advertisement will show shockingly bad reproduction. It is not just a "slightly off" or passable job; it is an unmistakable blotch. Under such circumstances, it is customary to summon the crew before the mast for an investigation. And they usually come carrying their alibi umbrellas in case of a storm.

It is learned that the photographer ingeniously contrived 22 poses and 17 lighting arrangements. A thoroughly reputable retoucher slicked up the photos and removed actually invisible defects. An internationally known typographer designed an exclusive headline letter, for an exclusive fee. The photoengraver turned out a self-admitted masterpiece. The electrotyper, practically low man on the totem pole, produced matrices of unsurpassable quality ("mats" by any plant of lesser reknown).

Despite all this—and the handsome outlay of money and expert time—the tear sheet told the tragic story. The ad did not in any way represent the product or the advertiser. It could only repel rather than attract interest and sales. It actually defaced an area of so-called "good, clean white space," so that the space money slithered down the drain along with preparatory costs.

The essential point here is how can such costly mistakes be avoided, or at least be reduced greatly in frequency? Although what follows may be an old, old story to most advertising and graphic arts practitioners, the information is needed. We need only count the anguished complaints about newspaper reproduction to be sure that somewhere, somehow, and too often, the safe, assured steps to good newspaper reproduction are being slighted—and probably unintentionally.

Before a newspaper advertisement can be printed there are seven steps to be taken. We are referring to the advertisement that is furnished in mat form to the newspaper. If electrotypes are furnished, the steps are fewer, but in this case we are considering the advertisement in mat form. These seven steps are taken successively. Each step starts with the quality resulting from the preceding step. At no point is it possible to restore or improve basic quality not present in the previous stages of work. Imperceptible diminution of quality from step to step will not,

normally, affect the final results noticeably. But when mishaps, inadvertences, human errors, deficiencies in skill or care get into the operation, the trouble compounds itself all down the line.

Let us follow these seven steps between the concept of a newspaper advertisement and its appearance in a newspaper.

1. Preparation of Art and Copy. Marked contrast is required in art copy for newspaper printing. The necessary processing steps tend to flatten the subject, reduce contrasts.

2. Photoengravings—Original Plates. What an original plate may lack in depth and definition cannot be restored. It is the quality peak for all succeeding plates, mats, etc.

3. Mats. These start with the pattern plate (made from the original plate) capable of withstanding enormous pressure from the mat presses. The materials and processes used are highly important.

4. Stereotype. In the newspaper plant, the mat is used to cast a stereotype, which is then locked into the page form.

5. Mat. The full-page form containing the stereotype is then used by the newspaper to mold a full-page mat.

6. Press Plates. The full-page mat (with whatever amount of shrinkage has taken place) is placed in a cylinder and a curved plate is cast in type metal. This plate is locked on the press cylinder.

7. Printing. When the press starts, the curved plate is inked. As it revolves it makes contact with the paper traveling through the press at several hundred feet per minute.

This brings us to the subject of shrinkage. It is the practice of many newspapers to shrink their mats to bring them within page dimensions. There is nothing standard about shrinkage, which may vary from $\frac{3}{4}$ to $1\frac{1}{4}$ inch in page width, depending mostly on the flong used to make the mats. Shrinkage of mats reduces the size of the advertisement without reducing the number of halftone dots by crowding them closer together. Thus a 55-line halftone, under shrinkage, becomes a 60-line or even a 70-line halftone. When this happens it presents a serious problem to the advertiser.

The advertiser has control over the first three steps, but not the last four. Newspaper printing involves one other factor that must be kept in mind. In lieu of make-ready the newsprint runs over a rubber blanket so that paper is pressed against plate to assure all-over contact. This pressure or "squeeze" indents the paper into the plate to a depth of around $\frac{2}{1000}$ inch. This squeeze thus nullifies $\frac{2}{1000}$ inch of the depth of the plate.

Now to get back to the question of who is to blame for the mangled newspaper ad? You know the printing conditions, and you know that many if not most newspapers are definitely presentable. So all responsibility cannot be tossed on the newspaper since there are three steps where the advertiser has control over quality. But if you cannot escape all cases of poor printing, you can at least reduce their number by heeding the following suggestions.

1. Art Copy. Marked tonal contrasts are absolutely necessary in all subjects involving tones. Newsprint is gray rather than white. Highlights tend to darken. Solids tend to gray out on irregular paper surface. Marked contrasts are particularly important where halftones are involved. Dark backgrounds should be avoided for dark subjects, and vice versa.

2. Engravings. It is vitally important that the engraver know how the engraving is to be used. If mats are contemplated, the engraver should be told, so he can make the plates properly. For halftones, the minimum safe etching depth for newspaper advertisements is .0075 inch for light tones in 55-line screen, .009 inch for 50-line screen. The maximum depth is in the original engraving—no subsequent plate can go deeper; if anything, it may lose depth. Fast presses, ink characteristics, soft paper, the squeeze, all contribute to possible "fill-up" of shallow plates, and emphasize the importance of etching depth.

3. Type. This is part of preparing original copy for the engraver. Type becomes engraver's copy in the form of reproduction proofs—"repros." Any visible defects in the proofs will appear on the plates. Type faces that are clean, open, and with fairly uniform strokes should be chosen. Best reproduction of type is assured by making 16-gauge electros of type forms to replace etched type in the original plates.

4. Engraver's Proofs. Original plates should be proofed on printing stock; newspaper plates should be on newsprint. Glossy proofs will tell nothing about printing results in a newspaper.

A check list of the points covered is given below.

Essential Precautions. (a) Contrasty art; (b) proper halftone screens; (c) deep etch and a clean-up etch; (d) proofs on print stock; (e) quality mats, electros, and plastic plates.

Hazards. (a) Shrinkage; (b) curved press plates; (c) the "squeeze"; (d) high speeds; (e) shallow molds.

These hazards are reduced somewhat by the use of electros or plastic plates instead of mats, due to the elimination of two steps.

SOME PRODUCTION HINTS

The size of a job should be planned carefully so that it cuts economically from the paper selected. It is also important to verify the specific sizes the printer can handle most economically so that all the bed space on the presses may be utilized. All this information should be at hand before any plates are ordered. Shortages and reruns always are costly. Therefore, ample quantities should be ordered and due allowances made for spoilage. The use of electros is advisable when it is necessary to make long runs of small leaflets and stuffers. Thereby, several copies may be made at one impression, or if there is sufficient advance planning, several different items can be run at once. Savings in presswork, folding, and binding may be effected if large presses are used to their full capacities. Page units of 8, 16, 32, etc., are most efficient; 12, 24, etc., are second choice.

Any printed material is most efficiently produced if standard-size sheets are used; i.e., sheet sizes should conform to the sizes listed in the accompanying table.

Years of usage have established these standard sizes of paper which are carried by all paper merchants. Trimmed sizes of the standard page, with the sheet out of which it is cut without waste, are as follows:

Page	Sheet	Page	Sheet
3¼ × 6¼	28 × 44	5½ × 8½	35 × 45
3⅜ × 5⅛	32 × 44	6 × 9⅛	25 × 38
4¼ × 5⅜	35 × 45		38 × 50
4½ × 6	25 × 38	7¾ × 10⅝	32 × 44
	38 × 50	8½ × 11	35 × 45
4 × 9⅛	38 × 50	9¼ × 12⅛	38 × 50
5¼ × 7⅝	32 × 44	10¾ × 13¾	28 × 44

The size of the sheet sent to the pressroom depends on the size of the book, untrimmed. A 16-page book, for example, trimmed to 6 × 9 inches, could be printed on a 24 × 36 sheet. However, when trimmed at the top, bottom, and both sides, the book will measure less than 6 × 9. Therefore each page, untrimmed, should be 6¼ × 9¼ and the sheet 25 long × 38 wide, since the 16-page form is usually imposed 4 pages high and 4 pages wide.

ESTIMATES

In every respect, all specifications should be identical and complete, when requesting estimates from various sources for a job. Alert vendors or manufacturers might suggest alternate production methods which might effect savings. They should be given extra consideration since they are making extra efforts to view the job from the buyers' point of view.

It is wise to establish as permanent a relationship as possible with the printer. For that reason, his qualifications should be explored in the same manner and with the same thoroughness used in hiring a salaried employee. Inquiries should be made as to the printer's background, type of work, quality, equipment, and reputation. As much advance notice as possible should be given to the printer before the placement of a job. This will help him schedule his time, meet delivery dates, and give each job the full benefit of his experience. All estimates and orders should be submitted on carefully designed forms, with duplicate follow-up copies, to prevent confusion and misunderstandings between the printer and his customer. At the time of the estimate, both should agree on an exact dummy or model, containing special creasing and folding specifications for cutouts, to preclude the necessity of working out new prices when the final working dummy reaches fruition.

DUMMY

When submitted to the printer, the dummy should be of the exact size required, with specifications of the kind and colors of illustrations, paper, type faces (display and body), color break-up, bleeds, and binding. Such a procedure will avoid confusion after the order is finally placed, and prevents the addition of unexpected extras on the bill. The dummy should be flat-bound or saddle stitched to facilitate layouts and paste-ups. To prevent the dummy from curling or bending, a shrinkage allowance should be made when planning, and care should be taken not to stretch the cellophane cover. Good papers for the dummy are offset, white bond, or ledger (20 to 24 pound), because they resist tearing and take erasures well. Different color paper should, of course, be used for identifying inserts or special pages, in order to simplify references to the dummy and to save time. Negative photostats of the original copy are often desirable for scaling purposes, as they can be checked before the plate is ordered, so that production of incorrectly sized engravings can be avoided. If more than one dummy is necessary in order to keep the job moving by producing several parts simultaneously, photostatic copies are satisfactory.

8

LITHOGRAPHY

This process discussed in this chapter is known by several names—photo-offset, offset-lithography, offset, and lithography. It is a planographic printing method. It prints from a plane or flat surface, which is neither intaglio nor relief, and employs the principle that water and grease do not mix. The image area of the plate is made greasy and tends to accept ink and repel water. The nonimage area of plate is given surface tension by graining, it tends to retain water and repel ink.

Lithography is a major printing process steadily increasing in importance and use. Because offset-lithography excels in pictorial softness, in fine halftone printing on rough paper, in elimination of make-ready, and in time- and money-saving potential, it is qualified to compete successfully with other methods of reproduction. Such advantages as the flexibility of letterpress printing, the accuracy of detail and speed of rotogravure, and the brilliancy of the color reproduction of silk-screen printing are gradually being met by offset-lithography, which is overcoming its former limitations. (See App. I, A and G, for samples of offset lithography.)

Each printing process can be tested for any job. When the production man understands the advantages and limitations of each printing process, he can apply them to the demands of the specific printing job in hand, and make his final selection of method on a practical basis.

Although high-quality reproduction is often synonymous with high costs, offset-lithography can produce excellent quality at a relatively low cost. Moreover when long runs are required, lithography or offset-lithography, as it is sometimes called, is desirable for any category of printed matter because it offers the following features: low platemaking costs; little make-ready; ganging up; conversion; large-sized jobs; stepping up; halftone printing on rough paper.

1. Low Platemaking Cost. In lithography, as in gravure, the cost of line and halftone copy is usually figured as part of the entire printing cost. The relative costs in breakdown form indicate a substantial saving through use of the offset process. In offset the average charge per square inch ranges from 12 to 15 or 18 cents for square, dropout, vignette, or silhouette halftones, or for combination line and halftone. For larger-size halftones, ranging from 32 square inches to 64 square inches, charges may be 10 cents and 8.5 cents, respectively. Time and material determine the cost basis. In offset no extra charge is made for line copy if it is positioned on the layout and is in scale. Further savings are possible when screen velox photos are incorporated with line copy, as they also are shot as line copy.

2. Little Make-ready. In contrast to letterpress printing, offset-lithography requires comparatively little make-ready. This is a time-saving factor and therefore a money-saving factor as well.

3. Ganging-up. Ganging-up, or printing more than one impression in a single operation, is successfully done by offset. The nature of the individual job is the deciding factor in the use of ganging-up, which offers a definite economy in time.

4. Conversion. When a job has been printed in letterpress in full-color process plates, it can be economically converted for offset printing. For a change in size or for gang runs, conversion is specified. Any copy that has already been printed can be quite satisfactorily reproduced providing the proof is good. Hence, conversion is often used for reprint work.

For example, an advertisement in four-color process printing appearing in the Saturday Evening Post can be reprinted with equally good appearance in offset. Such reproduction is more economical than making a new set of plates or duplicate electros of the same size. Campaigns including direct mail, poster display, and car cards can capitalize on the magazine advertisement copy after proofs are available. This saves many dollars and permits broader utilization of the same copy and art work in many different advertising mediums. The economy of conversion is largely due to the fact that no color-separation or color-correction work is required since the lithographic negatives are made from progressive proofs of letterpress plates which have already been color separated and corrected.

5. Large-size Jobs. Photoengraving equipment for large-size work is limited. When the printing run for large-size work, such as posters, is over 5000, offset-lithography usually does the job; under that figure, the job is done by the silk-screen process, but only when the technique is in flat color. Ranging from 52 × 74 inches in size, offset presses can print

a sheet of 44 × 64 inches. Large-size work in runs of 10,000 or under can also be efficiently handled by the collotype process.

6. Stepping up. The stepping-up process in offset offers an economical method of duplication. In offset the step-and-repeat machines reproduce duplicate copy photomechanically in excellent register. The time necessary for each repeat image is approximately 3 minutes, while the cost is constant, regardless of size. On small-size label work, the cost is less than that of making duplicate electros. The speed of duplicate images and the elimination of make-ready, for this type of work, are often deciding factors in the selection of offset-lithography as a reproduction technique. See also page 173.

7. Halftone Printing on Rough Paper. Because, in the offset-lithographic process, the ink is applied from a rubber-covered offset cylinder, such papers as fancy finish antique, bond wove or laid, and uncoated cover stock can be used to print halftones of 120-line screen or better. This important feature enables advertisers to save considerable expense, especially on long-run printing. For example, an advertiser can use an inexpensive uncoated stock in place of the highly coated paper used for letterpress halftone work. Color printing on uncoated paper gives exceptionally good results in the offset process.

Offset-lithographic printing on uncoated paper is excellent for the recipe books issued by national food manufacturers as part of their advertising and public relations campaigns. Because pages of coated paper may stick together when handled by damp or wet fingers, recipe books of uncoated paper may sometimes be more practical, look better, and last longer for actual kitchen use.

Uncoated paper is well adapted to printing children's books because its nonglossy finish tends to lessen eyestrain. Offset-lithography can produce fine illustrations for these books in full-color-process halftones at a relatively low cost.

Although bond papers have good lasting quality, they do not permit good halftone screens in letterpress printing. With offset-lithography, however, fine halftone can be applied to bond paper with an illustrative technique. Lithography on bond paper is especially desirable for sales letters and four-page, letter-size advertising messages, because it enables them to illustrate halftone copy either in monotone or full color, thereby dramatizing the message or letterhead for increased effectiveness. For letter campaigns, offset can reproduce letterheads and illustrative copy in a single operation, while the small amount of handling required speeds the production and reduces cost.

As a rule the greater the moisture content of the paper used for printing, the more slowly the ink will dry. Conditioning the paper by lower-

ing its moisture content to that of the pressroom will produce a paper superior to one increased in moisture content. Many lithographers specifically state that the moisture content of paper, when delivered to them, must be no more than three fourths to one percent above that of the pressroom.

Offset is also valuable for instruction books and manuals which must be printed on bond paper because of its durability. This process can produce good halftone illustrations on bond paper for this purpose.

Department stores which enclose illustrated advertising material with their monthly statements like lightweight, opaque bond paper, with halftone copy printed on both sides of each sheet by the offset process.

Coated offset paper is widely used as a cover for the inside pages of booklets, direct-mail folders, catalogs, house organs, and similar publications, because it is particularly suited for varnishing, which gives more brilliancy to the colors.

PREPARATION OF ART COPY

Any type of art work can be reproduced by the offset process. Inasmuch as the offset reproduction will be only as good as the original copy, cleanness of the white paper and blackness of the ink are definite assets. This sharp, clean copy is desirable for any reproduction process. Good conditions for the mechanics of offset printing insure good results for the client.

Reasonable care in preparing copy accomplishes many savings, and regardless of the nature of the copy, substantial economies are possible because of the ease with which reductions and enlargements of lithographic copy can be made. To prevent smudging or creasing, offset copy must be carefully mounted on Bristol board and covered with a cellophane overlay. Only thin and opaque paper is suitable for patching and, if the printed result is to be free of unwanted shadows, the edges of the patches must be absolutely flat and beveled with a sharp knife.

Black-and-white Line Copy. Line reproduction of a single-tone value, such as hand-lettering, typography, typewritten copy, and drawings in black and white, is the simplest form of art work and the most economical in offset printing. The various types of black-and-white art work are commonly known as pen-and-ink, crayon, dry brush, woodcut, Ross board, proofs of type matter, scratchboard, or stipple. If a tone or screen is to be added for a Ben Day appearance, Bourges, Contak, Craftint, or other shading methods are used.

Glassine or cellophane proofs are advantageous for offset production, but special care must be exercised to be sure the required opacity is obtained by dusting the copy with a suitable powder, or by using a

special machine which prints and dusts the copy on both sides simultaneously.

Typewritten material should be carefully handled so that the letters are clean and sharp with no smudges. For good results, copy must also have true alignment and spacing.

Whenever possible, to economize, the typewriter can be substituted for set type. Several models of justifying typewriters, or even a regular machine, can justify margins. With an ordinary typewriter, spaces must be inserted in lines that are short, but the result on the printed sheet appears completely finished. New equipment available for typing offset copy will justify the right-hand margin and given an even, black impression in a variety of type faces. Any machine used must always be clean and must write either with a black carbon ribbon or on the back of a carbon sheet placed face down on the white paper. Clarity of the finished job depends largely on the quality of the original copy. Black ribbon must be high quality, preferably a carbon-paper type of ribbon. A uniform touch is absolutely necessary in preparing offset copy on the typewriter, or a spotty job will result. In typing, a sheet of celluloid inserted behind the paper improves the impression. On some typewriters, type impression is automatically controlled so that the operator's touch does not affect the amount of ink or carbon deposited on the paper.

Black-and-white Halftone Copy. To provide satisfactory results in offset reproductions, all halftone copy should be supplied to the offset printer with clean separation and contrasting tonal values. Photographs, wash drawings, airbrush, or oil paintings in black and white are the accepted media for this process. It is not advisable to make halftone reproductions of copy that is already in screen, because this will create a pattern. A flat photograph, out of focus or overexposed, will not reproduce well unless it is highly retouched. The most desirable copy is a glossy print with sharp definitions of black and shades of gray in clear separation.

For best results, photographic copy for litho work should be on double-weight, medium-gloss photographic stock. A photograph which has an abrupt shift from light to dark areas (a short-tonal-range photo) will not usually reproduce as well as a photo which has a gradual transition from high light to shadow. Best for offset printing is a hard-surface, white woven paper that will stand heavy handling.

Retouching for Offset-lithography. Most photographs require some retouching to enhance their appearance and to give them better reproductive values. To achieve the best results, it is wise to instruct the retoucher to use warm grays of a yellowish or brown tint, because they

reproduce well and are faithful to the original copy. Cool grays, containing a bluish cast, reproduce lighter than the original and give a washed-out appearance in printing. All black areas should be painted with a glossy black for brilliancy in reproduction. The airbrush is a valuable instrument for spraying flat, even tones; no brush marks are visible, and a uniform tone is achieved in printing.

Too much retouching can be as harmful as too little. The retoucher should give care and thought to each separate job, bearing in mind the source of light and the texture of the object in photographic expression.

Two-color Copy, Duotone. Offset printing excels in reproducing two colors, especially in duotone. The original copy for duotone is in black and white, retouched with more contrast and emphasis than the average photograph. A duplicate halftone is imposed at a slight angle, allowing dots of the second color to overlap the dots of the key plate, thereby creating a startling and beautiful effect. The use of two complementary colors, such as dark brown and light blue, in duotone printing will give the effect of a third color. Dark blue and orange, or dark green and red, will also give the effect of a third color.

A duotone is sometimes confused with the printing of a halftone over a solid-tint block of a second color; but this method is properly known as straight two-color printing.

For straight two-color printing, the drawing is prepared as usual, with a color overlay tissue to indicate the second color for position, either in tone or solid color.

Three- or Four-color Copy. Preparation of art work for three- or four-color reproduction in offset does not differ from preparation for the other processes. Such usual copy as transparencies (Ansco color, Ektachrome, or Kodachrome), oil paintings, color photographic prints, color-toned photographs, water colors, and the like may be reproduced with excellent results. (See App. I, A and G.)

Art for Lithographic Display. Art preparation for lithographic display is in no way different from preparation of art for other forms of advertising printed in offset-lithography. However, a design in simple poster style is most desirable and effective, and solid color, wherever possible, creates an attractive display. For economy in production it is advisable to indicate an extra color in addition to black, with the second color concentrated in a single spot for prominence and effectiveness.

Art for Poster Display. Poster art is a specialized field of advertising art. The most suitable poster technique is based on simplicity of design

and effective use of color. Solid color not only is an economical factor in reproduction, but is also conducive to increased impact for the sales message. Lithography is especially suitable for poster reproduction, because this process can use large plates which are corrected easily with the least amount of breakage.

Blow-ups. Blow-ups, or oversized reproductions for window and store display, are reproduced in offset-lithography from separation proofs of the original color plates used in publication inserts. Generally these are blown up from two to five times the size of the original reproduction. Additional copy, such as headlines, may be introduced and treated as line or halftone inserts from separately drawn material.

LITHOGRAPHIC PLATEMAKING

The Camera and the Copy. Copy for offset-lithography is set up before the camera and illuminated by powerful arc lights. A line negative is made from line copy, while photographs and wash drawings are shot through a halftone screen. Filters eliminate any undesirable tints in the copy. Copy may be reduced, enlarged, or reproduced facsimile, as marked.

The Negative. After the copy is shot to size, the exposed film goes to the darkroom for developing. The next step takes place on the stripping tables. Here the line and halftone copy are stripped, mounted on a glass flat, and positioned according to the layout. Any undesirable marks or paste on the edges of the photographs are eliminated to make a clear negative. A skilled retoucher applies his talents to sharpen up halftone copy wherever necessary so as to ensure good results in printing.

The Zinc Plate. The litho plate is a grained zinc or aluminum sheet that is flexible and durable. It is coated with a sensitized solution, the plate is whirled around, and is then ready for positive printing. The complete and assembled negative is placed in a vacuum frame with the sensitized litho plate and exposed to powerful arc lights. After proper exposure, the litho plate is developed and carries a positive photographic print. The plate is then examined and retouched to eliminate any defects.

The Deep-etch Plate. To maintain printing quality for long runs of 50,000 to 200,000, the printer provides a deep-etch plate. Although the final printing is always planographic, the deep-etch plate is etched so that the design is slightly intaglio. A plate so treated is ready for long-run printing in one or more colors, gives greater clarity and definition to the images to be reproduced, and imparts a richer tonal quality. Recently developed bimetallic plates will permit lithographers to handle runs of 500,000 and more without changing plates.

Bimetallic Lithographic Plates. The use of bimetallic plates is gradually replacing the single-metal grained zinc and aluminum plates. Bimetallic plates are single lithographic plates combining two metals, one where nonprinting areas comprise a water-receptive metal and one where image or printing areas comprise an ink-receptive metal.

Lithographers find many possibilities and advantages in the several bimetallic plates now available. No one type of bimetallic plate can be credited as most suitable but all should be considered by the lithographer to determine which one offers the lithographer a new market, and which one is in line with or lower than present costs.

The many advantages of bimetallic plates that have encouraged their use are:

1. There is less printing trouble on ungrained plates. Uneven coatings on mechanically grained plates, caused from time to time by the whirlers, make for poor printing.
2. For long runs of 500,000, or more, the bimetallic plate excels the grained plate by saving expensive press time.
3. Bimetallic plates that do not require graining are easily made and are more economical than deep-etched plates.
4. The bimetallic plate requires less water, provides a good grease-receptive surface, and eliminates many ink problems.
5. The smooth surface of bimetallic plates provides better printing of halftone dots and fine line copy.
6. The ungrained bimetallic plate with nonprinting areas comprised of chromium, stainless steel, or the chemically prepared aluminum surfaces rarely corrodes. This feature not only provides long runs, but makes possible the reuse of plates for printing after they have been stored.
7. The ink-receptive metal of the bimetallic plate is more durable than the albumen and deep-etch zinc and aluminum printing surfaces. Because of its durability the use of newspaper stock is possible in printing.

LITHOGRAPHIC PRESSES

THE PRESS

Offset-lithographic presses utilize qualities of attraction and rejection in the inks, water, and chemicals, which are carried to the litho plate by a series of rollers. Wrapped around a cylinder of the press, the flexible plate, when inked, imprints a rubber-blanketed cylinder with a moist ink negative image which is, in turn, transferred to paper sheets.

Offset-lithography uses various types of presses, each suitable for a particular job.

1. Flat-bed Press. This press is, to a great extent, obsolete because it involves hand-feeding of the sheets of paper. The bed for the plate, or

stone, traveling back and forth, is capable of printing in one color only, and takes a sheet 46 × 46 inches in size.

2. Automatic Direct Rotary Press. This press prints directly from a metal plate on the cylinder. It can print one to four colors on a maximum sheet size of 46 × 66 inches, and may be fed either by hand or automatically. Only a limited number of these presses are in operation.

3. Offset Rotary Press. The offset rotary press prints indirectly from metal plates. It is capable of printing as many colors as are required, and has a unit for each color. Each unit contains three cylinders—the plate cylinder, the rubber-blanket cylinder, and the impression cylinder. Sheets ranging up to 50 × 72 inches in size are fed automatically. (See Fig. 8–1.)

4. Offset Rotary Web Press. This press is made to order and it is capable of printing four colors on one or both sides of the sheet, one and three colors on either side of the sheet, or two colors on both sides of the sheet. The offset rotary web press delivers flat sheets, can rewind the web, and deliver folded signatures. This type of press is constructed so that special attachments, such as numbering, perforating, imprinting, and pasting machines, may be incorporated in it.

STEP-AND-REPEAT MACHINES

The step-and-repeat process involves the use of photocomposing machines which produce multiple images of Ben Day, halftone, sketches, or line, or combinations of these or any other kind of copy, just as in photoengraving. Either negatives or positives may be used, and exposed directly on the metal or on sensitized metal plates. If a camera is substituted for the step-and-repeat devices, it must have a special back that will hold and move the sensitive glass or film sheet that is used in this process. In this way the work can be done directly from a line drawing or transparency. However, experts insist that the best multiples can only be done away from the camera on a machine where the sensitized material remains stationary, while the subject may be moved over it to the proper position and then printed on the sheet by an exposure under timed light. The same subject may be moved and printed repeatedly on the same sheet in other spots.

This technique permits stickers, blotters, folding boxes, buttons, stamps, bottle caps, check backgrounds, book linings, compass and clock faces to be printed in black and white or multiple color, always in perfect register, provided that vertical and horizontal center marks are accurately shown on the copy. Color register and proper position of the subject can be determined only by such marks. Once the material has been exposed, the usual platemaking routine is followed.

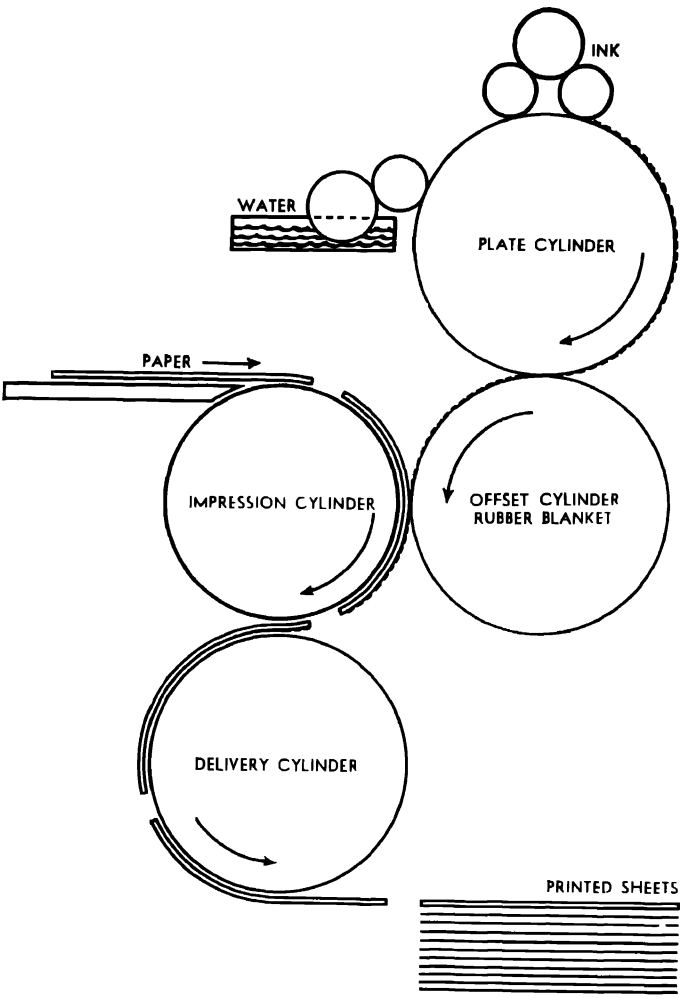


Fig. 8–1. Offset press principle. Plate cylinder is alternately damped and inked. Water repels ink from nonprinting areas. Printing areas accept ink. The inked plate cylinder places image on rubber coated offset cylinder, which transfers image to paper on the impression cylinder.

Where color is specified, color separations are required. Copy is always submitted in black and white.

In addition to the advantages of speed and economy where multiple images of a single subject are required, the step-and-repeat process is easily adaptable to all other reproduction processes. Seven important advantages of the step-and-repeat process are:

1. Reduced labor costs because lock-up time, electros, and stripping are completely eliminated, perfect register is always assured, and less make-ready is necessary.

2. Faster production because less press tie-up permits more working hours each day.
3. Lower time costs because 50 percent of cutting on bleed jobs is eliminated by single-operation trimming.
4. Lower paper costs because subject alignment accuracy of .001 inch cuts costs about 25 percent.
5. Lower plate costs because elimination of original and duplicate plates saves from 20 to 30 percent.
6. Widely varied type reverses because of the inexpensive production of multiple images and photocomposing.
7. Unusual angles in lines of type, if desired, because the rotary negative holder permits this effect without extra expense.

POSTER PRODUCTION

The American economy has derived great benefits from poster advertising, which is a compelling and dynamic force in reaching mass markets and stimulating mass purchasing. No other advertising medium reaches so many people so fast in performing the functions of advertising, selling, and improving human relations.

Whereas simplicity is desirable in most other media, it is an essential factor in poster advertising. The reason is obvious. Posters must make their impression on passing consumers in the fleeting moment of time it takes to walk or ride by a specific location. Therefore, the complete message must be conveyed immediately. Both copy and art must be sufficiently dramatic and convincing to arouse a quick emotional impact that drives home a single important selling message.

Prior to World War II, informed sources estimated that 95 percent of post art was painting, of which 50 percent was in oil and 45 percent in water color. Direct-color copy from Kodachromes, carbros, and similar originals comprised the remaining 5 percent. Immediately after the war, however, the role of the color camera in poster sketches increased enormously. Technical discoveries and new techniques have speeded the progress of poster making to the point where all colors can be handled photographically, including the manufacture of the plates. Thus, today's 24-sheet color posters can portray the lifelike realism captured by the camera.

The finished drawing for plain lettering posters should measure at least 10 inches high by 22½ inches long. If the poster layout calls for designs or figures, larger finished drawings are required, up to 20 × 45 inches. The size of the finished drawing of a poster containing art work is largely dependent upon the medium used in the sketches.

Carbon prints are excellent examples of color-photographic copy in direct color work. In the reproduction of 24-sheet posters, Kodachromes and smaller transparencies are successful only if they show the necessary

sharpness and clearness of detail. A complete sketch should always be furnished, with all the elements in their proper places, including lettering, background, and illustration.

The sketch must always be prepared in the ratio of 1 to 2¼, because the dimensions of a complete 24-sheet poster are 104 × 234 inches (2¼ times as long as its height). To attract immediate attention, poster colors should be strong and bold. Consideration should be given to the fact that, in the finished poster, the design will be enlarged several times. It is important to remember, too, that the poster will be exposed to all types of weather for at least 30 days.

Immediately after completion, the approved sketch is sent to the lithographer's plant. There, poster specialists work out the best possible section and sheet divisions. This is done on tissue overlays. The following are the specific goals of the layout of ideal section and sheet divisions, controlled, of course, by the design of the poster itself:

1. To use the least possible amount of printing which will afford the most faithful reproduction. Each section requires a different number of printings—some, two or three, others, as many as six. An average poster (with a large pictorial) might require from 40 to 60 printings.

2. To minimize mismatching by cutting through important features of the illustrations (such as trade-mark, thin-line lettering, or facial features) during processing and posting.

The method of reproduction usually is selected by the lithographer's planners. They may decide that the poster be all hand drawn, a combination of hand and photography, or all photographic. Hand-drawn reproduction is best suited to lettering and line-work posters. A combination of hand and camera work is ideal for posters containing lettering, plus line work, plus some halftone pictorial material. Since the camera provides the maximum truth and reality of photographic compositions, some lithographers treat almost all posters by the all-photographic method.

POSTER PLATEMAKING

Posters may be hand drawn completely or in part. They are usually reproduced from a gelatin scratch key on a photographic copy.

For the scratch key, a sheet of gelatin is placed over the sketch and a complete tracing is made on the gelatin with a sharp point so that the various color details and sheet corners are clearly outlined, the latter to serve as register marks. An opaque fills in the engraved lines and corner marks so that they become solid on a transparent surface. A line negative of the key is shot (about 6 × 8 inches of each press sheet), and projected photographically onto the master plate to produce a sensitized zinc key.

These zinc-key plates carry all the color, division lines, and register marks. They are etched slightly, and impressions are pulled from them in black ink on sheets of paper by a transfer press. Chalk offsets are then made by dusting the sheets with a brown powder. The brown lines and marks formed by the powder are pressure-transferred onto full-size grained press plates. One of these plates is required for each color. With a greasy pencil, the lithograph poster artist draws in the necessary detail on each plate, following the key lines.

The crayon may be rubbed in various ways to produce different degrees in tone, as required. The plates are then etched and ready for the press.

Another hand method is to place an entire 6 × 8 negative of the complete sketch in a movable stereopticon projector, installed on a platform so that it can be moved backward and forward at right angles to a wall space large enough to take an image of the negative in full 24-sheet poster size.

In the exact position and size that the finished lithograph will be, key sheets are placed on the wall and the camera is focused on them for an enlargement of the negative in the exact size of a 24-sheet poster.

With a black crayon, an artist outlines the details of the enlargement on the sheets. The 10 key sheets are then pressure-transferred onto 10 zinc plates.

After the artist has gone over the lines with a black, inky, liquid tusche, the plates are given a slight etch and an impression is printed on white paper in black ink. A special brown powder is dusted over the impressions so that chalk offsets may be made on actual-size press plates, and the same procedure is followed as outlined above for hand-drawn posters. For photographic reproductions of part, or all, of the poster, the section and sheet division are noted on the sketch, which is photographed on a precision camera with color filters. Enough shots are made to produce an individual negative for each color of each printing-sheet area. Some plants make direct halftone negatives which are enlarged photographically onto a metal press whose surface carries a light-sensitive coating.

Offset or direct-rotary lithograph presses are used for reproducing posters. In choosing between the two lithographic methods, the nature of the design must be considered. Since many posters require great strength of color in large areas, direct presses are most often chosen. Cost and time prohibit the pulling and submission of proofs on 24-sheet posters, but special care is given while the sheets are on the press.

In printing colors, yellow is usually printed first because it is opaque. Red, black, blue, pink and gray, buff or flesh tones follow. Blue serves to unify many design elements, and gray helps to reproduce the delicate tones and values which often appear in paintings.

Ink and Paper. Because posters must endure all sorts of weather conditions during their lifetime (about one month) on the billboard, it is important that careful thought be given to the ink and paper used in their preparation. Many lithographers maintain laboratories where researchers constantly check all inks and component ingredients and colors, and develop new processes and techniques in color, lithographic varnishes, and other ingredients.

Poster-work paper is a white machine-finish paper, of about 25 × 38 inches, 60 pounds to 500 sheets.

Flagging. Flagging is the peeling of edges and corners of poster sections as the result of the action of rain, sun, and temperature changes. Rough-back paper which accepts paste more readily, and hence clings to the board more securely, was developed and successfully used even before the war.

Small Runs. Although most outdoor advertising posters are made by lithography, when small runs from 50 to several hundred are required, the silk-screen method is more economical. For this type of reproduction, the designs should be principally in flat-color areas. In silk screen, an airbrush can effectively create fine effects where a figure or package is shown.

Paper for silk-screen work is usually a 70-pound white offset which, though not as rugged as machine-finish, is quite satisfactory, especially when varnished for weather protection.

When an illustration forms the major portion of a silk-screen poster, photogelatin can be successfully used for the reproduction if the run is short. The high cost of photoengraving plates and type makes letterpress a rather expensive proposition for poster work, but a simple design or large text can be reproduced in this way from woodcuts or rubber plates. Most car cards are run in letterpress but, in those cases where the same design is scheduled for both outdoor posters and car cards, the work is done by lithography.

MULTILITHING

As the name implies, the multilith machine is lithographic in principle. Because it is easy to operate and requires but a short period of training for expert operation, the Multilith has been adopted by many business offices for business-form duplication.

Almost any writing instrument may be used to make an impression on the Multilith reproducing plate. Without being damaged, the plate will receive markings directly from a typewriter, pen, brush, ruling pen, or carbon paper. An image as large as 9½ × 12½ may be reproduced on this plate. Once the plate is attached to the Multilith machine (a quick

and easy procedure since no tools are required). up to 5000 legible copies per hour may be produced. When the master (reproducing) plate is prepared, it is clamped to a cylinder on the Multilith machine and alternately moistened and inked. The blank surfaces of the plate repel the ink but retain the moisture, and the inked surface (the prepared part of the plate) imprints the design on a rubber blanket which, in turn, offsets the impression on the paper.

A simple photographic process is employed for black or color reproductions of original forms, advertisements, or illustrations. Quality copies can be obtained in 30 minutes from a Multilith sensitized plate to which the subject has been transferred.

Since no cuts, typesetting, or special paper are necessary, Multilith is economical in both time and cost. There is also the advantage of the recently developed duplex plate, which can be used on both sides. Most firms generally use the Multilith for letterheads, invoices, statements, checks, bulletins, circulars, catalogs, reply cards, maps, graphs, charts, diagrams, drawings, advertising and sales materials, and special and routing forms.

DECALCOMANIAS

Decals are composed of several layers of ink or paint film forming a picture or design on a paper backing. Application of a small amount of water will remove the backing, leaving the picture or design transferred to the chosen surface. Stickative, a special adhesive which is part of the decal, keeps the image attached to the surface which is being decorated. The process, though very inexpensive, provides many designs at the cost of a few cents. If these same designs were painted by hand, the cost would run into several dollars each.

To illustrate the versatility of these printed designs, the following list suggests places where they may be applied:

Furniture, hardware, store windows, autos and auto parts, mirrors, glass doors, typewriters, walls, toys, china, enamelware, railroad cars (for interior decoration and exterior lettering), seals on liquor bottles, permanent perfume-bottle labels (collodion type), city and state cigarette-tax stamps applied to outside cellophane wrapping, truck lettering.

Most decal films are made by lithographic stones on flat-bed presses; others are run on rotary presses with a metal lithographic plate; still others are produced by silk screen, or by other methods less widely used.

Decalcomania paper is a special type which is kept in an air-conditioned pressroom before and during all processing, to prevent the expansion or contraction that accompanies atmospheric changes. Air conditioning is of utmost importance, because decals demand many more press impressions

than are customary in most forms of printing, and a conditioned paper is required for good register. Special inks are also necessary, since the pigment must remain of the same size during repeated impressions. Single or simplex paper is quite porous and has a blotterlike surface covered with a water-soluble coating of starch, glycerin, and albumen, whereas double or duplex paper is a thin tissue which may easily be removed from its heavy sheet backing at the time of application. Double or duplex paper is coated in the same manner as single or simplex paper.

Regular or varnish decals may be printed face down on a coating of either single or double paper. This type of decal is used on the sides of trucks, machinery, typewriters, and similar items. The first film of ink applied to the paper is the coat that will appear on the outside when finally transferred. After this initial inking, subsequent printings apply the more opaque colors with several coats of opaque white applied last for added strength. The opaque white is not visible in the finished job.

Bronze, aluminum leaf, gold leaf, and almost any colors that approximate the colors of gold or silver are used for metallic decals. Letters applied with a tacky varnish will take aluminum leaf, allowing the surplus to be brushed away, with additional color prints protecting this fragile metal. To make perfect contact, the decal is put in position and rolled down on the back of the varnish-coated transfer. When the paper is wet, the coating is dissolved. This leaves the paper free to be drawn away, the decal remaining on the surface.

Regular decals, mentioned above, are used on duplex paper when the design contains open letters without background. The only difference in application is the removal of the heavy backing before the soaking in water. This leaves a thin tissue paper which permits the operator to see that every part of the transfer is in perfect contact before the water is applied.

Window decals resemble regular decals, but are easier to apply. The colors are printed so that the one to be in direct contact with the window is face up, last instead of first. If the transfer is die-cut, a stencil is used to apply the stickative to the complete film so that only the design to be transferred is covered. Complicated designs, however, are rather difficult to die-cut.

Sometimes window designs that may be read on both sides are required. These are made by building up the design layer by layer until the pattern to be seen from the inside is complete. Several opaque layers are then applied and another design lithographed on top of them, with the color nearest the subject printed last. About 42 printings are required in a job of this kind.

Where various elements of design are not actually linked together, regular decals are used for slide-offs. Slide-off decals are mostly found on machines, tools, toys, hardware, and furniture. In this type, the adhesive coves from the coating on the paper, with several opaque coatings printed for added strength. The design itself is then printed and a clear film of lacquer added over the design. Such items as chinaware and kitchen ranges require mineral decals, made with mineral colors which must be fired in the plant for permanency. Mineral decals are printed face down.

For lacquer decals, a white lacquer film is applied to the paper and then lithographed. These are mostly used for trade-marks on gasoline pumps.

Name-plate decals of harder pigments than appear on ordinary transfers are coated with a glossy or nonspecular abrasion-resistant finish, and may be applied to crinkle finish, aluminum, cadmium, and nonspecular surfaces by various solutions and cements. Name-plate decals are specified for difficult surfaces, special adhesion, or great resistance to wear.

SCREENLESS PRINTING OR COLLOTYPE

Because collotype (photogelatin) printing is done without a screen, it is possible to reproduce work printed by another process without risk of a moire effect and with a texture similar to that of a photograph. Although collotype falls in the lithographic category, its technique and results differ from usual planographic printing in several ways.

Screenless printing is a facsimile process good on runs ranging from 100 to 10,000. Because this technique reproduces pictorial copy without the prohibitive costs of photography, it has its own place in the graphic arts. Although the finished photogelatin print carries a grain that is not visible to the naked eye, no screen or dot is used and the result is a continuous-tone reproduction, which more closely resembles photography than does any other photomechanical process, without the use of expensive plates.

Collotype is best suited to produce short or medium editions of illustrated catalogs, booklets, displays, posters, picture post cards, greeting cards, blowups of magazine advertisements, car cards, and color work without delicate detail, where the color separation is performed by hand.

Collotype is also particularly adaptable:

1. When color reproduction is wanted from pictorial black-and-white originals.

2. For large blowups. As there is no screen, delicate texture effects are as satisfactory in blowups as they are in small reproductions.

3. For enlarging halftone proofs to be used as copy. A tint passes through the screen dots giving the effect, on the enlarged print, of finer screen reproduction.

4. For full color reproductions of art subjects, scientific illustrations, and microscopically detailed illustrations.

Photogelatin may also be used in conjunction with other printing methods. For example, in a high-grade, profusely illustrated booklet, the type matter can be done in letterpress and the illustrations in photogelatin.

Combined with silk screen for displays and posters, one-color photogelatin creates a striking effect against the flat colors made by silk screen.

Collotype printing no longer employs the old flat-bed presses and hand-inking; it has progressed to large rotary presses with automatic-inking mechanism.

However, the plates are the key to the tone values produced without the benefit of a screen.

The making of a collotype plate includes the following steps:

1. The subject is photographed. Pictorial matter becomes a continuous-tone negative, while type and black and white become line negatives.

2. Two unscreened negatives are combined and retouched. They may be kept distinct and separately exposed to the plate, or stripped together and shot as a single exposure.

3. Parts not to be printed and the edges of negatives are next opaqued.

4. The plates, which are usually aluminum, are commonly coated on a whirler in preparation for a rotary press. A vacuum bedplate on the turntable holds the plate in a rigidly horizontal position. Centrifugal force spreads the emulsion which coats the plates.

Heat elements in the whirler dry the emulsion, which is generally a gelatin, bichromate of potassium, water, and ammonia solution. Sometimes other chemicals are added, according to weather conditions.

5. The cooled plate is placed face down on the negative in the vacuum printing frame. For best results, plates are coated one day, exposed 24 hours later, and put on a press 24 hours after that.

6. Light allowed to pass through the negative exposes the plate. Exposure time depends on the quality of the negative and strength of the light.

7. The bichromated gelatin is tanned by the light coming through that part of the negative which will print black in the finished copy. The grain produced lacks sharp distinctions between inked and non-inked sections, and is much finer than the finest photoengraving screen. In developing, the chemicals are washed from the unexposed parts of the plate and the plate is left in a dustproof closet overnight.

8. Finally, the plate is soaked in a glycerin solution for about 30 minutes. The amount of solution absorbed by the plate determines the amount of ink it will accept, and this controls the printing tones and the amount of ink on the paper. The nonprinting areas of the plate swell more and accept more glycerin, leaving the printing area .006 inch below the surface of the nonprinting areas. This difference in levels makes little difference in the printing process, since collotype printing is primarily a matter of chemical selectivity, with the glycerin-soaked areas (nonprinting) repelling the ink, and the printing areas (with less glycerin) accepting the ink in inverse proportion to the amount of glycerin each has absorbed.

9. The make-ready for photogelatin involves preparing the plate to accept a relative amount of moisture for required results. Another application of solution is necessary where shadows lack detail and are too dark, with an alkaline solution for dark portions of the plate. In screenless printing the ink is stiff and tacky, and fed from an ink fountain. The heavy ink offsets because the printing is direct, therefore slip-sheeting is used where the back of the sheet must remain clean. Rubber printing rollers distribute the ink over the plate, and a spray gun or humidifier keeps the plate moist and the pressroom at a relative humidity of 60 to 80 percent.

When the plate and the ink roller make contact, the moist, nonprinting areas do not receive ink which is accepted by the hard, unmoistened printing surface.

The middle tones vary in degree of moisture according to the degree of light they received during exposure, and will accept a proportionate amount of ink.

Offset, bond, ledger, vellum, Bristol, tub-sized coated, and soft stock are all acceptable papers for photogelatin reproduction. However, proper balance between the moisture content of the paper selected and the humidity of the pressroom is important. Many collotype printers, therefore, require that paper with a given moisture content be especially made for this printing.

Original copy for screenless printing may be wash, oil, water-color, black-and-white sketch, Kodachrome, repro proof, color print, photograph, combination of art and photography, or original negative or positive. A line negative is made of type, a continuous-tone negative copy, and the material is stripped into position. Type should be solid with no fine serifs. All copy should be submitted ready for the camera.

Hand or photographic separation is employed on original color copy for color work, and most commercial work is separated by hand. For this a single neutral negative is made, and a selective stencil-like handmade

mask for each color blocks out the unwanted areas for a given color. The plate is exposed to the masked negative once for each color, with a different mask each time for each desired color plate. This procedure must also be followed for color jobs to be reproduced from monochrome copy.

For multicolored reproductions from one-color drawings or photographs, the hand-separation method is also used, and is almost impossible to distinguish from camera separation. For hand separations, cellulose overlays are painted out as the nonprinting areas for the particular color being worked on, and are cut away in the printing areas. The copy is then photographed through the mask. Care must be taken to ensure the precise register of each mask used for each color with the original art copy.

Camera separation is more accurate and more expensive, and used primarily for art work. As a rule, only four negatives are needed, although more may be made if desired. Excellent color detail and tone are reproduced by this method. When photogelatin reproductions are to be made from a job formerly done in process-color letterpress, progressives or black proofs of the four-color plates may be used; the latter is the better method.

Photogelatin work provides no way to get proofs before the press run. If the plate, as wrapped in the press, will not yield the desired effects in a few spots, certain areas may be lightened or darkened up to 15 percent on the plate, for the desired result.

Making a new plate at night with corrections for next morning's use means little additional expense. Exact duplicates in multiple plates cannot be used, because the gelatin plate is made-ready chemically. Although plates may not be stored for future use, new plates are inexpensive.

Negatives and overlays, however, are stored and can be assembled quickly when needed for making new plates.

9

GRAVURE

Gravure (photo, roto, color, or plain) is an intaglio printing process using either copper cylinders or copper plates.

PHOTOGRAVURE

The first of these processes to be developed, photogravure, requires a graining box which contains a quantity of asphaltum salt. This box is revolved on its axis until the powder floats in the air within the box. Then the box is held stationary so that the heavier asphaltum particles may settle to the bottom. After a few minutes the plate is placed within the box on a series of dowels, and the finer, lighter grains of powder deposit themselves on the surface. The plate is then carefully removed from the box and heated over a flame, to fix the fine dust particles and create a screen pattern. A carbon-tissue positive print is squeegeed onto the plate, developed, dried, staged, and etched. Printing is done on a hand press with a heated plate and bed. Very stiff ink is applied to the plate—enough to fill all of the ink cells. Then the plate is hand wiped, and paper dampened, and hand power is applied to the press. In this process, production of over a hundred prints is considered a good day's work. While screening is now done with more modern methods, basically photogravure has not changed much since the early days since, although produced on a power press, it is still printed on single sheets, one at a time.

PRINTING GRAVURE

The chief difference between gravure, letterpress, and lithography is in the printing: gravure prints from a design below the surface of the plate; letterpress prints from a design above the plate surface; litho prints from a design on the same level as the rest of the plate.

Screen for Gravure. The screen for gravure is cross-ruled and may be as fine as 200 lines to the linear inch. In the finished print, it is barely

visible to the naked eye. Type, photographs, wash drawings, line drawings, oil painting, and hand-lettering—everything to be printed by gravure—must be screened, not just continuous-tone copy, as in other printing processes.

THE PRINTING PROCESS

The actual process of printing gravure is as follows: The plate is covered with ink, filling all the cells. The surface of the plate is wiped clean by a doctor blade (a flexible steel scraper), which removes all surplus ink and permits ink to remain only in those areas which are beneath the plate surface. These ink-filled cells, coming in contact with the paper, produce the printed result. Actually, the transfer is brought about by tremendous pressure on the paper which sucks the ink out of the cells. The deep cells contain the most ink and produce a strong color; the shallow cells, with less ink, produce a lighter color. Hence the varying depths of the cells can produce both soft effects and deep shadows in a single impression (see Fig. 9–1).

Although there are slight variations, basically the process is the same for all gravure and follows the same basic process:

1. All art work is carefully examined for suitability of size and for gravure reproduction.
2. Art is placed before the camera and a continuous-tone negative is made in the size to be printed.
3. The negative is retouched to restore tones lost by the camera.

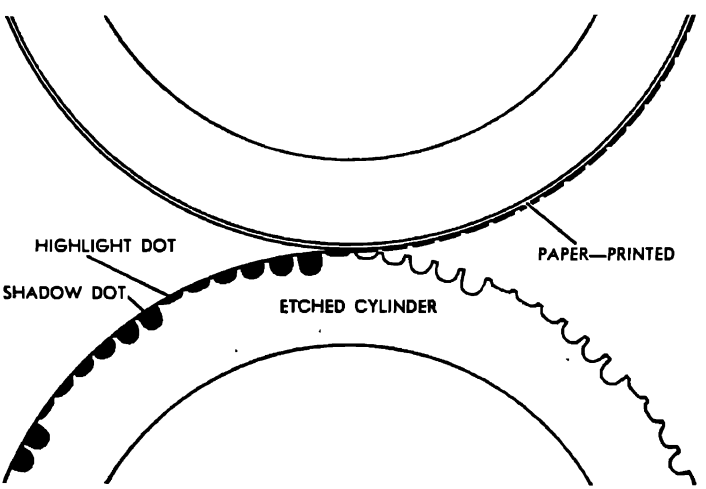


Fig. 9–1. Cylinder detail. In gravure, all dots have same surface area. Tone gradation is controlled by varying depths of ink wells. Deeper wells hold more ink and print a dark area. Finer screen plus the tendency of ink to spread on a surface makes dots blend, almost obliterating the screen pattern.

4. The type is photographed from coated-stock proofs and a negative made on thin film or wet plate.

5. The retouched art negative and the type negative are set in position and a one-piece positive is shot. Final corrections and retouching are done on the positive.

6. The complete retouched positive is mounted in full-page size on a glass plate.

7. A carbon-tissue sheet coated with a layer of gelatin, is placed under the gravure screen in a vacuum printing frame, and the screen is printed on tissue under strong arc lights. When printed and etched, this screen forms the ink cells.

8. The resulting sheet of carbon tissue is photographically printed with a gravure screen of about 150 lines to the inch for newspapers, or about 200 lines for fine commercial work.

9. A complete-page positive (containing art and type) is printed on the carbon sheet, right over the screen print.

10. The carbon tissue is now transferred to the printing cylinder on which etching is done. This cylinder is faced with electrolytically deposited copper which has been ground and carefully polished with charcoal or emery paper for a smooth, perfect surface with a wide enough tooth to hold carbon tissue.

11. The complete page tissue is laid face down in proper position on the cylinder, water is applied with a heavy squeegee roller to make the tissue adhere to the cylinder, and the page is developed.

12. Warm water is applied to the tissue, and the paper on the back is removed. The developed part of the gelatin, which holds the copy, hardens and remains on the cylinder.

13. Margins and other nonprinting areas are painted over on the cylinder with asphalt acid-resistant varnish to prevent etching of these portions.

14. The cylinder is placed over the etching trough and, as the cylinder is rotated, acids of varying strengths, starting with the strongest and working down, are applied to the etcher with cotton swabs. The acids cut through the gelatin into the copper to produce the ink wells.

15. After the etching, an engraver goes over the plate with an engraving tool to emphasize tones and shadings not satisfactorily produced by etching.

16. The cylinder is then put on the press for proofing and the first proof is critically examined, corrected, and revised where desired.

17. Corrections are made on the cylinder or, if extensive alterations are required, new negatives, positives, and cylinder are made.

18. The cylinder is put on the high-speed press for printing (see Fig. 9–2).

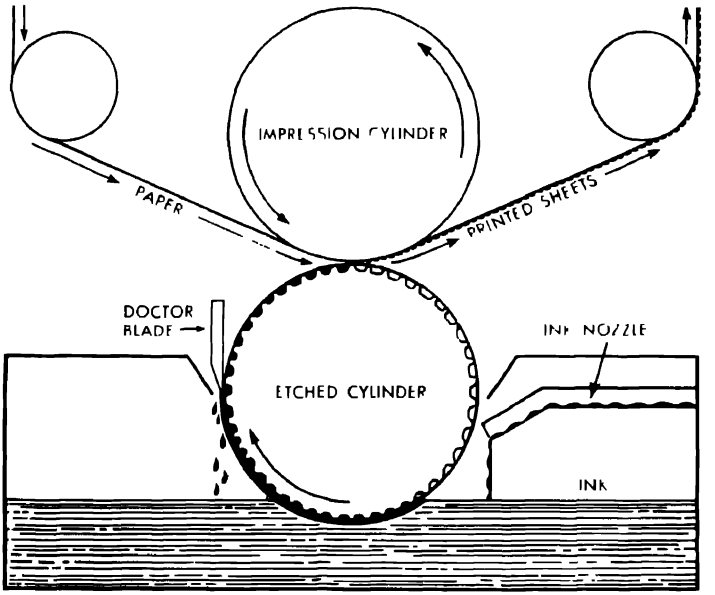


Fig. 9–2. Gravure press. The etched plate cylinder is inked by high pressure from a nozzle in the enclosed fountain to make certain all etched wells are filled. The doctor blade scrapes excess ink from the cylinder as it revolves. The plate then comes into contact with the paper and the ink is drawn out of the wells.

19. The cylinder revolves on the press in an enclosed or semienclosed fountain. This action forces the ink into depressions in the cylinder.

20. A doctor blade scrapes the cylinder surface and removes excess ink.

21. A rubber impression roller forces the paper into contact with the printing cylinder and preliminary copies are produced.

22. First copies are compared with the original art work.

23. Additional corrections are made by buffing, tooling, or further etching.

24. The press is put into motion and printed copies are produced at a rate of 500 to 40,000 per hour.

Colorgravure. For color gravure, a separate cylinder is prepared for each color. Every step, described above, is followed for each color cylinder.

A recently developed device for gravure presses automatically controls register as the web passes rapidly from one printing cylinder to the other. This device is an electric eye with two heads that scan the cylinder and web. If the second color is out of register, the eye automatically moves the cylinder into proper position. Thus, the third and fourth printings are also controlled in relation to the first and second.

Ink. Because of the high press speed, with the paper traveling at the rate of more than 1000 feet a minute, rotogravure inks dry quickly. The ink for roto is liquid, not pasty and thick as for letterpress, and consists of coloring matter, binder, and volatile substance.

Photogravure presses run at a speed much slower than that of roto and the inks do not have to be so quick-drying. The paper is much heavier and has a firmer surface than roto paper. Therefore, photogravure inks contain the same basic elements as roto inks, but are of heavier consistency and dry more slowly. Gravure printing requires three to four times as much ink for printing as does an identical area in letterpress or lithography, but the total cost is not increased because gravure inks cost less per pound than do the inks for other processes.

GRAVURE STOCK

Gravure stock must be absorbent in order to trap and prevent smearing of ink. It must also have a smooth, glare-free surface to help the printer achieve a soft, clean reproduction of all tone gradations, from delicate highlights to deep shadows. Gravure stock must have sufficient opacity to prevent strike through, and have a very high moisture content. Photogravure stock should generally be heavier than roto, with an eggshell or semiantique finished firm surface so that fuzz will not lift off the paper and lodge under the doctor blade. Also of great importance is the elasticity of gravure papers. Because very heavy pressure is brought to bear during the printing operation, the paper is subjected to a large amount of stretching and distortion. Adequate resiliency overcomes any danger of permanent harm.

Publications printed in gravure, such as Look, afford advertisers shorter closing dates than do most other large magazines, and have no extra bleed charge. Standardization of rotogravure handling procedure in New York and Chicago has reduced colorgravure rates, and standardization of roto inks is under consideration.

GRAVURE COPY

Color. For faithful reproductions, color-rotogravure art should be prepared with the basic colors of intaglio printing in mind. Copy should be in one piece, including illustrations, type, etc. The register is truer than when several pieces are stripped in. Copy should be on a good grade Bristol board with a smooth surface and a good working background. Perfect press proofs, which are final, should be mounted in exact position on the board. Two duplicate type proofs must be supplied to provide for such emergencies as smeared copy. All proofs of an advertisement should be attached, mounted, or sent in separately; it is wisest to mount them in exact position. A thin line of Chinese white around all pasted pieces eliminates the danger of shadows. Since the layout will be

photographed in the identical size, the layout should be made actual size. Blocks of small type, such as 6 point, should be avoided; 10 point is the smallest size which will satisfactorily take care of reverses or surprinting over a tone. Transparent proofs should be pulled on thin onionskin with a special black ink and dusted with very fine bronze powder, or pulled on cellophane dusted black with oxide of iron. All proofs should be solid black.

Different Types of Copy. Any art work in which illustration values predominate, such as paintings, etchings, or photographs, can be reproduced by gravure. Some types of copy, of course, give better results than do others. Photographic prints should be soft, rather than full of contrasts. Etchings require no preparation and are reproduced in facsimile. Wash drawings give excellent results if done in colors that photograph in correct relation to each other. Chinese whites and other poor photgraphic whites should be avoided. Pencil and crayon sketches can produce remarkable results, but require more time in production. Because of the screen used on all gravure work, line work is satisfactory when reduction is not too great.

Although screened type matter is not as sharp as letterpress work, it is satisfactory and perfectly readable. Italics and light-faced type in smaller sizes should be avoided in gravure.

DULTGEN PROCESS

For greater sharpness in detail and larger range of tonal value, gravure men employ the halftone screen. Before its invention, gravure could not hold the tonal gradations so easily produced by letterpress, but now even detail in the shadow areas is clearly retained.

For four-color gravure printing, the Dultgen Halftone Intaglio Process is now more widely used than any other method. Both the Dultgen Process and standard color gravure require carbon tissue, and are the same in the preliminary steps of photographing the copy and making the negatives. The radical difference shows up in the making of the positives, the kind of screen, and the printing on carbon tissue. The conventional gravure process works with a continuous-tone positive obtained from a continuous-tone negative, and the screen is printed on the carbon tissue before the positive is applied. The Dultgen Process, however, requires two sets of positives, both made from continuous-tone negatives. One of these positives is made with a special reverse halftone screen which has a thinner cover glass, resembling that used in making four-color letterpress plates. Both sets of positives are printed on carbon tissue in exact register—first the screened positive, then the continuous tone. The carbon tissue is squeezed onto the copper and the cylinder is etched. Ink

wells, varying in both size and depth, provide two ways to control tone values in the process.

ROTOGRAVURE

Roto is an intaglio process printed from paper rolls. The name "rotogravure" is a combination of rotary and photogravure, the latter also an intaglio process, but sheet-fed.

The most common example of roto is the illustrated Sunday newspaper supplement, which uses the high-speed mass production obtainable with this printing process to the greatest advantage. As in all other processes, the high speed does not endanger the quality of the finished job, which is determined by the copy. Better results are obtained by better copy.

For many years rotogravure has enjoyed a wide popularity for printing such types of merchandise and materials as wallpaper, calico, textiles, silks, wrapping papers, oilcloth, linoleum, labels, box covers, cellophane, glassine, and tissue. Roto is also used for books, calendars, greeting cards, direct-mail advertising pieces, art subjects, and photographs with a wide variety of tone gradations.

Printing Roto. In printing roto, the cylinders are rotated in a thin ink which, in turn, is wiped off the surface of the roll by a flexible doctor blade. In this way only the etched portions of the cylinder retain the ink which is transferred to the paper. Although in printing roto there are no tonal values, the illusion of these values can be created by the areas of dead black and white and the mixture of closed space. Because of the proximity of the etched recesses the printed impression of gravure, at normal reading distance, gives the effect of continuous tone. The etched recesses or wells which hold the ink vary in depth (since each represents another strength of tone), but are uniform in size. Hence the thickness of the ink controls the difference and intensity of tone.

Any color or combination of colors can be used in gravure printing as in letterpress. Brown, however, is often identified with roto. Gravure is characteristically soft and velvety in appearance, and frequently uses the softness and warmth of brown, but the softness does not depend on the color used.

STEEL ENGRAVING

Steel engraving is another intaglio-printing method. The artist works directly on the plate with tools suited to the copy; the tooled (lowered) portions of the plate comprise the printing surface. The metal for engraving is usually steel or copper plate, and no acid etching is involved.

Because delicate lines can be produced precisely, these engravings are especially suitable for currency. Their fine lines are reproduced

faithfully over long runs, and their design is almost impossible to duplicate by hand or camera.

As an art medium, steel engraving has never been popular because of its wiry lines, but it is liked for engravings on fine stationery. Here, however, similar embossed effects can be achieved simply and inexpensively by thermography—letterpress printing in which a powder poured on the printing surface causes the ink to rise (or self-emboss) when heat is applied.

On occasion, when tone copy is to be reproduced by steel engraving, the copy is transferred to the plate by photography and an intaglio halftone is produced. The plate is coated with an etching ground which can be hand- or machine-tooled. When the copy is to be enlarged or reduced onto the plate, a pantograph is employed.

Stamping presses are used for steel plates; hand presses are used for copper plates which can be etched, or tooled, or both.

10

THE SILK-SCREEN PROCESS

The silk-screen printing process is one of the oldest methods of reproduction. Based on the stencil idea, the mechanics of the process are so simple that many persons find it an interesting hobby. As a business it has grown in the past few years to a notable size. This country has approximately 3000 silk-screen printing shops, which employ about 30,000 skilled and trained people.

Because the silk-screen process is most economical in printings of 5000 copies or less, it advantageously serves the advertising of local firms, such as banks, small retail chain stores, and department stores.

Valuable in advertising and poster displays, silk-screen printing is also adaptable to packaging, and is used extensively in fields other than advertising. Some of its many uses are for printing on cosmetic jars, chair backs, dials, fabrics, games, greeting cards, radio instruments, sheet metal, soda bottles, wood, wallpaper, linoleum, decalcomanias, lampshades, book cloths, and plastics.

Before discussing the technique and manufacture of silk-screen printing, it is important to know some of the assets and some of the limitations of the process.

ADVANTAGES AND LIMITATIONS OF THE PROCESS

1. Size of the Job. The silk-screen process is not limited in size as are most other methods of printing. Silk-screen can print a sheet 44 × 64 inches or larger, and the screen can always be made to fit the specific job.

2. Paper or Printing Surface. The silk-screen process will print on paper as do the other methods; in addition, it will print on heavy card-

board. But it surpasses other methods in that it is also capable of printing on such surfaces as cloth, wood, glass, metal, and cellophane.

3. Inks and Color. The silk-screen process uses a waterproof paint of the oil-base family, which is similar to house paint and akin to printing inks. An important point is that the color is definitely opaque and will print over another color without bleeding or printing through. It is extremely brilliant in value and has a raised texture both to feel and vision. Addition to the ink of a vaseline-like substance, known as transparent base, can transmit any degree of transparency desired.

There is no limitation to the hue or value of the color. Any color, including gold or silver, can be printed with success, and paints may be glossy or flat, quick- or slow-drying, and flexible or hard. Fluorescent paint can also be used.

4. Preparation of the Art Work. Various techniques of art work can be used, such as the photograph, pencil drawing, oil painting, crayon drawing, or flat-color drawing. The flat-color drawing is the best technique because the reproduction results are superior. The preparation of the screen is easily handled for this method, and it is fastest and most economical. The number of colors, in a silk-screen job, can range from 1 to 64. Although the process is ideal for multicolor printing, it is not practical for blended colors or shading. Each color, or value of a color, requires a separate screen and a separate printing operation.

MATERIALS AND EQUIPMENT

1. The Screen. Silk (51 gauge) is the material most commonly used for the screen, although organdy may also be used. The silk or organdy is called the screen cloth. The stencil is applied to this cloth, and the paint passes through the cloth screen onto the printing surface.

2. The Screen Frame. The screen frame, over which the silk is tightly stretched and securely tacked, also holds the paint. The sides of the frame are sealed to prevent leakage of color.

3. The Table. The table is the supporting base for the printing. It hinges the frame and helps to keep the job in register.

4. The Squeegee. The squeegee resembles a window washer, consisting of two pieces of wood enclosing a piece of tough rubber about ¼ inch in thickness. The length of the squeegee is determined by the size of the screen. It will last indefinitely when handled with care and cleaned after each printing job. The squeegee, when drawn across the frame by the squeegee operator, pulls the ink from one side of the frame to the other side. This method of operation prints the first impression and every succeeding one.

5. The Drying Racks. Because silk-screen printing requires several hours for drying, specially constructed racks, of optional size, are necessary. Some racks are provided with casters so that they can be rolled around the shop for convenience. The kind of paint used, the surface to which it is applied, and the existing climatic conditions vary, and each variation influences the length of time needed for drying.

METHODS OF SILK-SCREEN PRINTING

Four methods are used in silk-screen printing: the block-out method, the lettering-on method, the cut-stencil method, and the photographic method.

1. Block-out Method. In the block-out method, the design is traced on the silk screen. A paint-resistant lacquer is applied to all the portions of the screen which are not to be duplicated, and acts as a filler. The open mesh of the screen, which is the design itself, will permit paint to filter through and print.

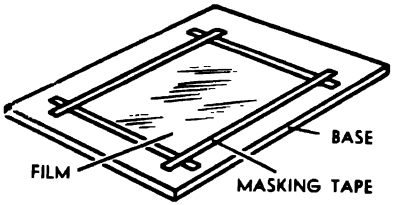
2. Lettering-on or Tusche Method. In the lettering-on method, sometimes known as the wash-out method, the design is painted on the screen with a water-resistant material such as lithographers' tusche. One side of the screen is covered with glue or a soluble material. When the screen is washed with a solvent, the solvent removes the painted design and leaves the background sizing so that the screen is ready for printing.

3. Cut-stencil Method. The materials used in the cut-stencil method are classified as paper and laminated film. In this method, the design is cut with a stencil knife and mounted on the screen by means of an adhesive, which is resistant to paint or shellac. The backing sheet is peeled off to leave a clear-cut stencil.

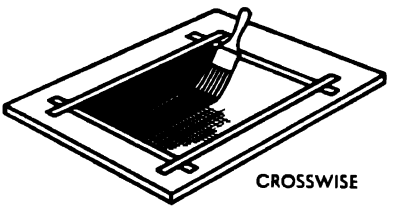
4. Photographic Method. In effect, the photographic method is a water-etching process. After the screen is coated with a sensitizing solution, a celluloid positive or negative is placed on a piece of glass under the screen. By direct contact and pressure, a 300-watt electric lamp is placed under the plate glass and given the proper exposure. This depends on the size of the screen, which is then washed out and dried. Only the portions of the screen protected by the opaque portion of the positive will wash out, and the balance of the plate is hardened to the screen, leaving the design open and ready for impressions. The steps in making a photographic stencil are illustrated in Figure 10–1.

THE FUTURE OF SILK-SCREEN PRINTING

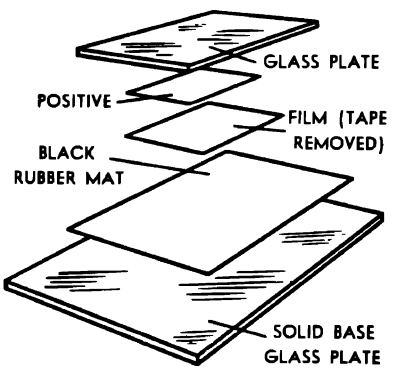
The march of progress toward a more efficient method of printing will undoubtedly carry with it a much more profitable future for the silk-screen process. Although remarkable strides have been made in the past



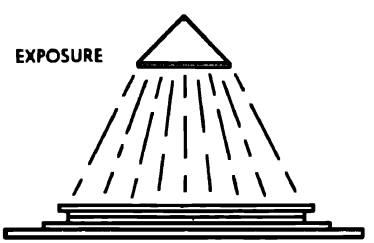
(1) The photographic film is fastened, with the emulsion up, onto a flat cardboard or glass.



(2) Sensitizer is evenly coated on the film with camel's-hair brush. It dries in about 15 minutes.



(3) Contact set up (cross section) for exposure. Starting with the table and going upward, we have a sheet of plate glass; a piece of black felt or black sponge rubber mat; then the sensitized film with the emulsion side down; positive, face down; and a sheet of plate glass.

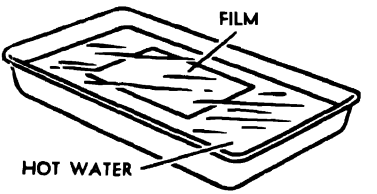


(4) Light for exposure may come from the sun, carbon-arc lamp, or a photoflood bulb.

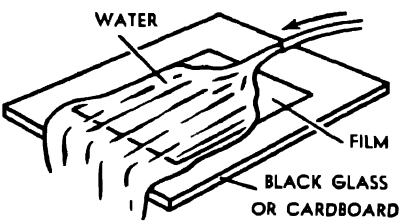
Fig. 10–1. Steps in mak-

Among recent developments in silk screen are hand-made stencils and four- making of a photographic stencil by the transfer method, using a daylight

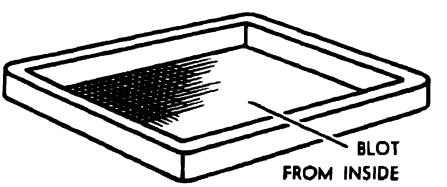
(5) Film is developed by submerging it, emulsion side down, in a hot-water bath of 120 degrees F. In just a few minutes, the copy image will wash away from the film, discoloring the water. Film is then turned emulsion side up. Development can often be hastened by agitating the tray.



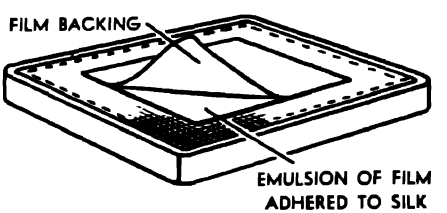
(6) To fix the image, the film is placed with the emulsion side up on a sheet of either black cardboard or glass and then sprayed with cold water.



(7) Film is adhered to the silk screen by blotting all excess moisture with newspaper sheets. Film must be thoroughly dried. This blotting process impregnates the emulsion of the film into the silk. An electric fan is frequently used to assure thorough and rapid film drying.



(8) Backing sheet is peeled off in the last step, leaving film emulsion adhered to silk. The screen is now ready for the printing. After the job has been printed and if no reruns are planned, paint is removed from the screen with a suitable solvent and the screen is washed clean in a solution of hot water and 5 percent ammonia. Then the silk is rinsed with a sponge and cold water, and dried. It can be used again.



ing a photographic stencil.

color process photographic stencils. Illustrated are the eight basic steps in film.

few years, the majority of silk-screen printing today is still a hand operation. Two men operate as a team, the squeegee man together with the take-off man who takes the wet impressions off the table and places them in the racks. The hourly run produces approximately 150 to 500 prints or impressions, since the production speed varies according to the size and nature of the job.

To achieve a greater production of pieces per hour in this process, ganging, or printing more than one copy at a time is practical, whenever possible. The application of this principle, of course, depends upon the nature of the job.

In the reproduction of flat colors, the quality of the silk-screened print is superior to reproduction by other printing processes. The superiority of silk screen also extends to short runs where economy is often a determining factor. The cost per copy for short runs in other printing processes is considerably higher than silk screen because of the expense of making original plates. The cost of plates sometimes exceeds the cost of the entire printing job in silk screen.

At present, the major limitation of silk screen is that the process cannot reproduce photographic or halftone quality. However, research in this area indicates that, in the not too distant future, silk-screen reproduction will compete much more closely with lithographic printing.

A few power-driven stencil presses are in operation today which can reproduce from 1000 to 15,000 copies per hour. New, specially equipped printing machines have been developed, which can print on cylindrical surfaces where permanent labeling is desired, on bottles, or on odd-shaped containers.

Printing buyers with vision are using all the advantages of all the printing processes by combining silk screen with other methods to achieve quality without the sacrifice of economy.

DUPLICATION METHODS

Fluid Duplicator. A fluid duplicator is a duplicating machine that makes direct copies from pencil, pen-and-ink, typewriter, or printed original, without stencils, type, or carbons. The Ditto machine is a well-known brand of fluid duplicator. As many as eight colors can be copied in one operation on the very thinnest of paper or on the heaviest of card stock. Any Ditto will reproduce any particular section of the copy or the entire sheet, and will take any sheet size up to 22 × 34 inches. Original copy may be reused several times and may be recopied immediately or up to a year later without losing any value. More than one original can be prepared at one time and all of them used, either together or independently. Any information to be dittoed may be written as accumulated and copied when completed. One hundred copies cost less than five cents.

Ditto will quickly, cheaply, and accurately reproduce bulletins, notices, reports, price lists, or such complex systems as order invoices, purchase orders, or production work orders, as well as many other kinds of forms.

The master copy is typed or written on a high-finish coated stock. A sheet of fluid-duplicating carbon paper is placed in a reverse position behind this master, so that a raised negative impression is formed in carbon on the back of the master sheet, which is then placed in the drum of the machine. As each copy sheet passes through the machine, it is slightly moistened with a special fluid. Upon contact with the master, the moistened copy sheet removes and holds a tiny layer of the original carbon deposit from the master. To ditto original drawn copy, the uncarbonized side of the carbon is placed on a hard, smooth surface and covered with the blank master sheet. Drawing is made directly on the sheet with a hard stylus.

Stencil Duplicator. A stencil duplicator is a duplication method in which original copy is prepared on a stencil, and which can produce 2000 to 5000 copies per stencil (400 on wax). To prepare the copy, the typewriter ribbon is removed or released and the type is cleaned before typing on the stencil, which is inserted into the machine. A well-known stencil duplicator is the Mimeograph.

In tracing copy for mimeographing, the stencil sheet is placed on an illuminated drawing board with the copy to be traced positioned under the sheet. Drawing is done with a stylus.

After the copy is finished, the cushion sheet is removed from the Mimeograph machine and the stencil is attached to the duplicator cylinder. The paper is adjusted on the feed table, then fed between the impression roller and stencil-covered cylinder so that the stencilized image is transmitted to the paper.

Dry stencils are used for high-quality work, for illustrative work, or for both. They take typing, tracing, and die impressions and can produce thousands of copies. Photomechanical stencils are preferred for complicated copy that an ordinary stencil will not take. Similar to blue prints, these stencils can be prepared by either the manufacturer or the user, will reproduce any line drawing on translucent paper, tracing cloth, or film, and will produce hundreds or thousands of copies.

Letterpress Duplicator. The duplication method relative to the letterpress principle is commonly known as Multigraph. It gives a uniform impression comparable in appearance to good typewritten copy, thereby permitting copy fill-ins to match. The speed of the process is in line with other duplicating processes of 1000 to 5000 impressions per hour, and maximum number of copies ranges from 50,000 to 200,000 printed impressions with all new type. Any writing paper, bond, or ledger stock can be

used with a sheet range of 3 × 5 inches to 17 × 17 inches. The process is adaptable to printing on both sides of the sheet in color. Special-gauge cuts or electros are required for illustrations. Type is set, or stereotypes or rubber plates are made and held in a channeled segment and inked by a roller for printing. However, printing can also be done through an inked ribbon wrapped around a cylinder. To make an impression, the paper is pressed against the cylinder by means of an impression roller.

Xerography. Xerography, a generic term, is a new dry process using electrostatic principles to take pictures, reproduce copy, and to print on practically any surface. The word "xerography" is derived from the Greek "xeros" meaning dry, and "graphos" meaning writing.

Xerography is a dry electrostatic method of reproducing an image. It is unlike other processes that are chemical in nature, such as silver-halide photography, or blue printing. The film, or paper, used in ordinary photography corresponds to the photoconductive plate used in xerography. The face of the plate is coated with a photoconductive insulating material and the back of the plate is coated with a foil-metal sheet. The coating on the face of the plate is conductive to electricity only when exposed to light. The plate is made sensitive to light when charged electrically, either by rubbing with a cloth in a darkroom, or by spraying with electrons.

Xerography is comparatively new, the first demonstration having been witnessed in October, 1948. Further development may bring about a revolutionary change in the graphic arts and with it these advantages:

1. The process is dry, because powder is used. There are no chemical solutions or fumes, and the xerographic process is easily incorporated into simple equipment.

2. The process is economical, utilizing inexpensive materials. Xeroplates may be used over and over again because the powder image remaining after the transfer is easily removed.

3. Speed, essential in production, is an advantage in xerography because a subject may be photographed on a xerographic plate, and the plate developed with a direct positive fixed print in less than 1 minute.

4. Xerography is not a difficult process to learn. An unskilled person can easily make good xerographic plates by following an established routine.

5. Color printing is possible by using colored developing powders of the desired color.

11

BINDING AND DIE-CUTTING

BASIC STEPS IN THE BINDERY

The five basic steps in the production line of a bindery are: cutting, folding, binding, trimming, and packing.

Cutting. The cutting of the printed sheets before folding is important and expensive, and from the very start causes variation. Each time the cutting knife goes through a pile of paper, a draw develops which varies in amount with the type and quality of the stock and replaces the almost certain accuracy of the press guide and gripper, which can be duplicated by a folding machine. Cutting should be eliminated whenever possible. However, working with circulars which must cut to bleed, sheet cutting is absolutely necessary. Here the desired result can be obtained only by the skill of the machine operator. But in booklet preparation, the sheets can be laid out so that each will run on the folding machine exactly as printed, regardless of the number of pages. Sometimes a slightly larger sheet may be required for this kind of operation, but the extra paper cost is more than compensated for by the improved appearance, and by the elimination of one production step.

Folding. There are two folding-machine styles: the knife and the roller folders. The knife folder takes impositions from 8 to 64 pages in one operation, except for such odd units as 20, 28, 36, 40, 52, 56, or 60 pages. Impositions of more than 32 pages are folded four times; where the stock exceeds 60 pounds, they are about as thick as a signature and require specialized machines not found in the average pamphlet bindery. Impositions of 48 and 64 pages can be made on stock up to 60 pounds,

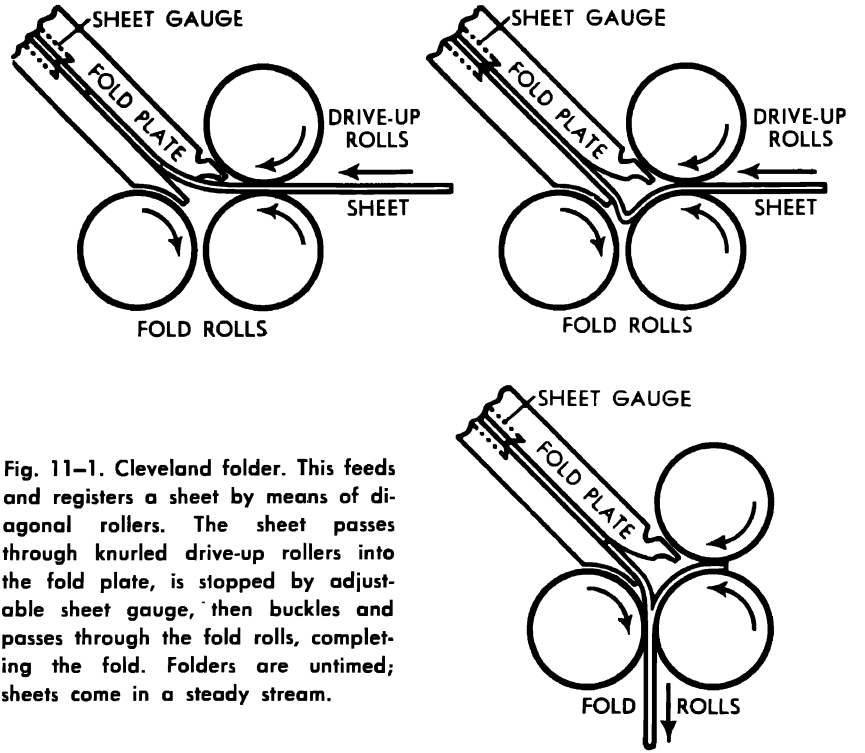


Fig. 11–1. Cleveland folder. This feeds and registers a sheet by means of diagonal rollers. The sheet passes through knurled drive-up rollers into the fold plate, is stopped by adjustable sheet gauge, then buckles and passes through the fold rolls, completing the fold. Folders are untimed; sheets come in a steady stream.

except on offset stocks, whose greater bulk and toughness work against five-fold impositions even in the lighter weights.

Roller folding machines are inferior to the knife folder on three counts. First, parallel folds have a maximum size of 39 × 64; right-angle folds, 39 × 52. The minimum size on standard roller machines is 3 × 4, with a minimum fold of 1 inch. Second, although the roller machine gives a greater output in more common sizes, the knife will produce a greater output in large sheets. Last, on light papers, especially when three or more folds are required, there are no compensations for the disadvantage of the roller folder.

The roller folder, however, is very flexible and can easily handle circulars and broadsides in many folding combinations that would be impossible on the knife machine. In booklet production, the roller folder will take impositions within its sheet range that cannot be done on the knife folder. Again, the factor of thickness demands consideration. Four folds are unsatisfactory on 80- to 100-pound stock; five or more folds are almost impossible on anything over 60 pounds. The problem of thickness is more important in broadsides than in booklets, because in the former there is no chance to eliminate air pockets by perforating.

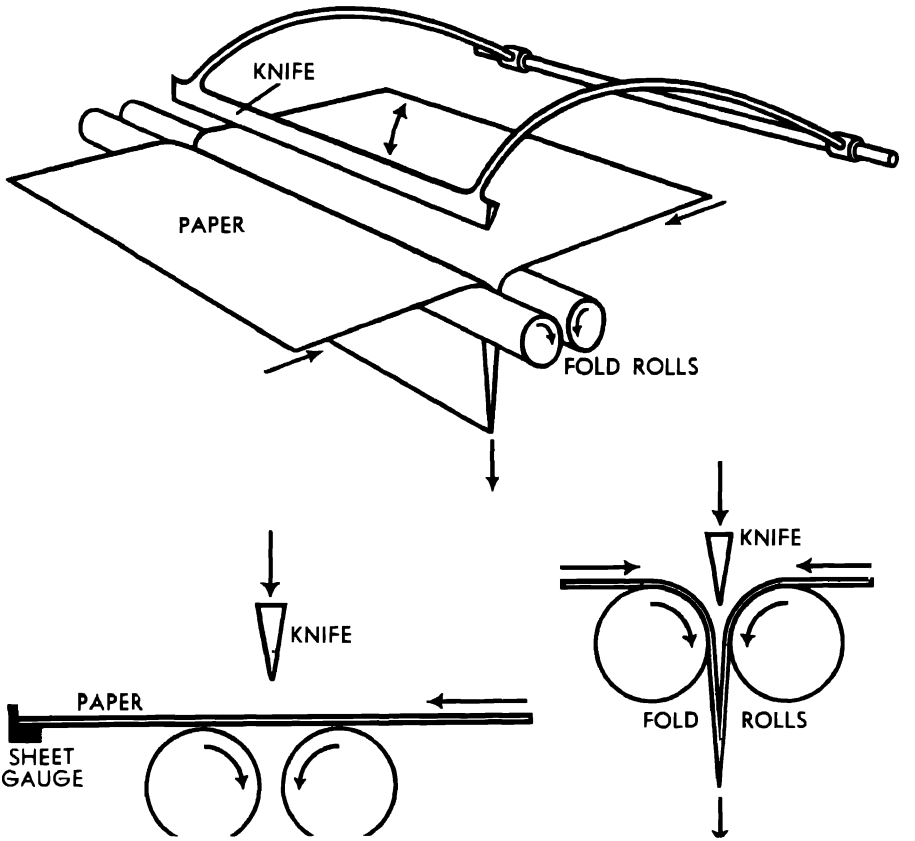


Fig. 11–2. Dexter folders. The Dexter principle uses a knife for folding. Sheets travel on tape conveyor to registering guides, coming to rest over fold rollers. A descending knife blade creases the paper and drives it between counter-revolving rollers. Dexter type of folder is a timed machine, with one sheet folded at each cycle of operation. In both the Cleveland and the Dexter machines, the sheets are conveyed to the successive folding units for making any desired number of folds.

Highly important in any folding operation is the grain of the paper. As the bulk of the stock, number of folds, and finished size increases, so does the importance of the grain. Generally, grain should run with the backbone of the book, or with the last fold of a broadside. With paper of 80 or 100 pounds, this is an absolute must.

A variation in the fold, which becomes progressively more difficult to control with each fold, is caused by folding against the grain, and results in a greater percentage of spoilage. Smaller size booklets will spring open when finished if the paper is folded against the grain, even when the paper is light enough to fold properly. Considering the all-important factor of economy, it is wisest to consult with the bindery experts before planning the printing of a job.

Because folding machines are very flexible, layouts can often be made with an eye toward considerable savings in the bindery. The longer the press run, however, the smaller the opportunity for such economy. Saving results from the use of multiple printing plates and sheetwise forms instead of work-and-turn. Advantage may also be taken of the larger sheet sizes possible in folding machines, and of faster production when the work is ready for the bindery.

The folded sheets or signatures are then gathered or arranged in sequence.

Binding. In the production of booklets, the next operation is binding: saddle wire stitched, side wire stitched, or sewed.

The most common is saddle wire stitching, which is fast, inconspicuous, and inexpensive. The folded signature is dropped on a chain which car-

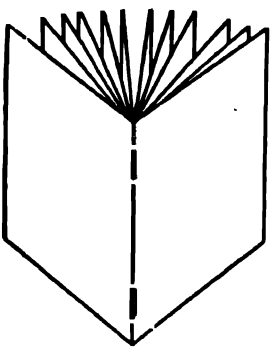


Fig. 11–3. Saddle-stitched cover, top, bottom, edges, trimmed flush.

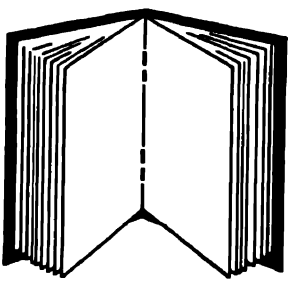


Fig. 11–4. Saddle-stitched cover, top, bottom, and edges extended.

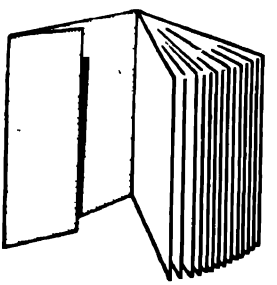


Fig. 11–5. Saddle-stitched binding with a short tuck-in flap on cover.

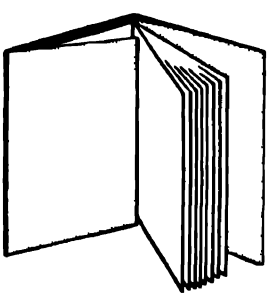


Fig. 11–6. Saddle-stitched cover folded deep on first and last leaves.

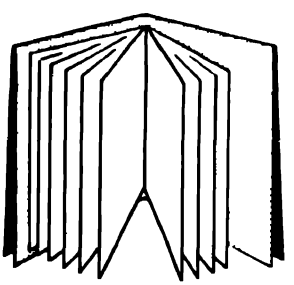


Fig. 11–7. Saddle-stitched pamphlet binding with French-fold cover.

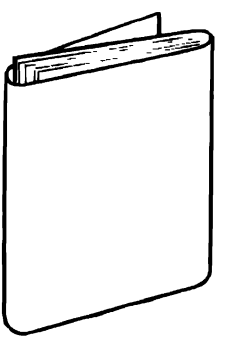


Fig. 11–8. Saddle-stitched pamphlet binding with a six-page cover.

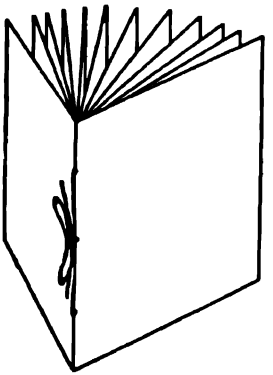


Fig. 11–9. Saddle-thread or saddle-cord pamphlet with bow on the outside.

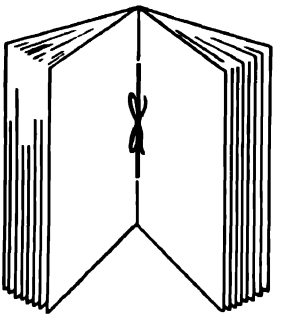


Fig. 11–10. Saddle-thread or saddle-cord pamphlet with bow on the inside.

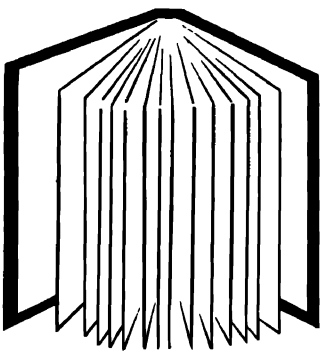


Fig. 11–11. Smyth-sewed pamphlet, opens flat. Text can be pasted to cover.

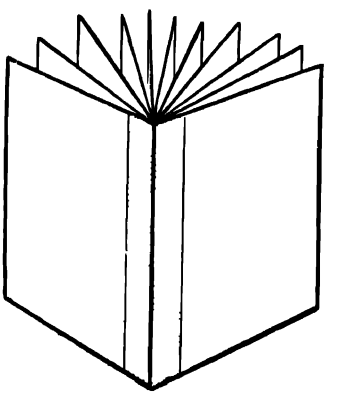


Fig. 11–12. Saddle-wire-stitched pamphlet. Cloth strip down the back, cut flush.

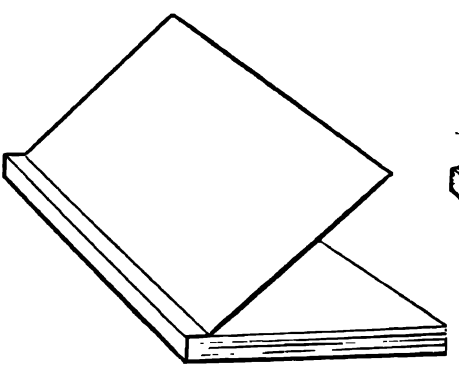


Fig. 11–13. Side wire stitched, glued-on back, cover hinged, cut flush.

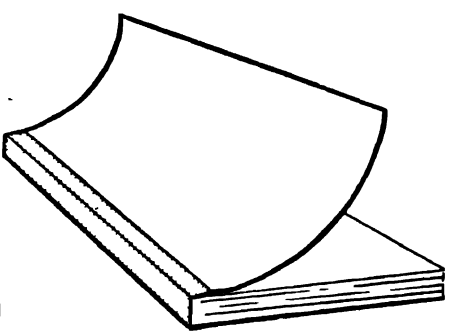


Fig. 11–14. Side wire stitched through cover, cloth strip reinforced.

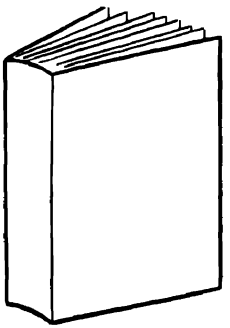


Fig. 11–15. The Smyth-sewed book in full paper cover.

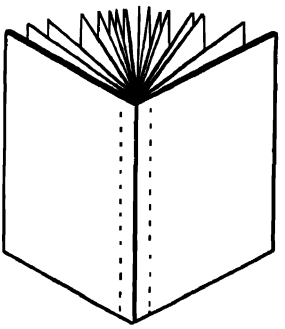


Fig. 11–16. Full paper cover as it is used over boards.

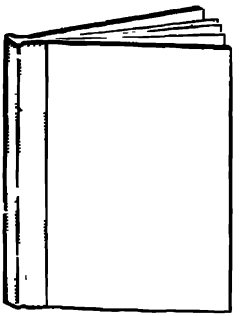


Fig. 11–17. A paper cover over boards, with cloth back.

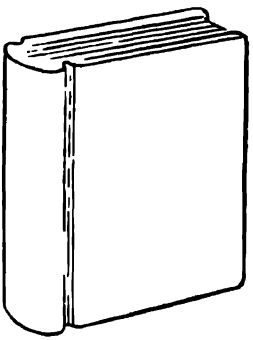


Fig. 11–18. A rounded back, used with a full cloth cover.

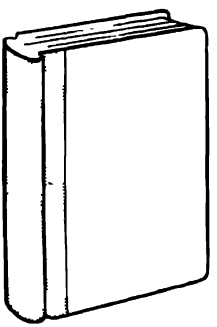


Fig. 11–19. A quarter binding, a paper cover, cloth back.

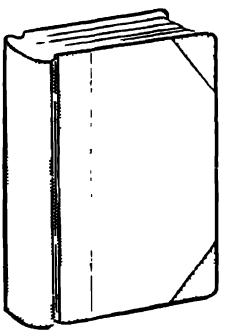


Fig. 11–20. A half binding, showing cloth back and corners.

ries it under the stitcher heads, where the staples are inserted by the action of a trip.

The stitching machine, which is equipped with several stations, can assemble a booklet of two or more signatures. These machines are made in sizes that will handle a 39-inch-long signature for as many as six booklets, which offers a saving through the use of multiple plates.

There are limitations to this method, however. In saddle wire stitching, two staples cannot, in one operation, be inserted in a space under 3½ inches wide. Stapling must be done with one wire stitch, or the material run through twice. In any case, small booklets can be satisfactorily bound with one stitch.

Another limitation is thickness. A quarter inch of paper is the maximum for saddle wire stitching. Beyond this point there is a danger of the wire pulling through the book's center spread, even after little handling. It is also difficult to trim thick books that are saddle wire stitched. With

this kind of binding, however, the book may be opened flat, even though it is comparatively thick.

Side wire stitching is next most economical, and is employed when the bulk is too much for saddle wire stitching. With this method the book is assembled and stitched flat, with the cover glued on afterwards, applied to the square backbone. When the bulk is not great, this method is more expensive than saddle stitching, but lends an air of thickness to a thin book. A single machine performs the entire operation—a machine not too well adapted to short runs because of the amount of preparatory time required. Since the staples must be at the least ⅛ inch from the backbone, side-stitched books cannot be completely opened.

Because the cover of the book can be hinged by this method, however, the appearance of the finished job is improved. To hinge the cover, a strip of glue ⅛ to ⅜ inch in width is applied down the first and last

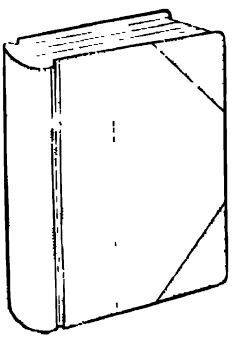


Fig. 11–21. Three-quarter binding with cloth back and corners.

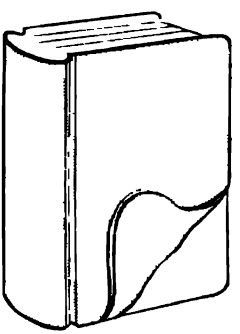


Fig. 11–22. Rounded corners, in using full leather cover.

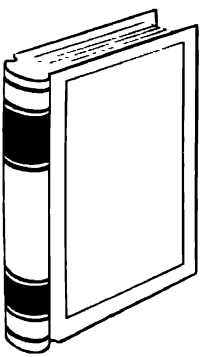


Fig. 11–23. Legal binding, with durable buckram covers.

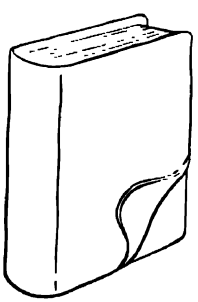


Fig. 11–24. Full leather cover and a leather lining.

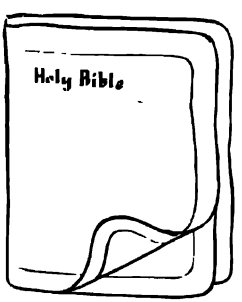


Fig. 11–25. All leather cover with overlapping edges.

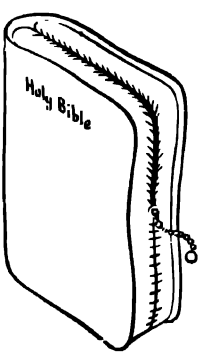


Fig. 11–26. Leather cover with zipper protected edges.

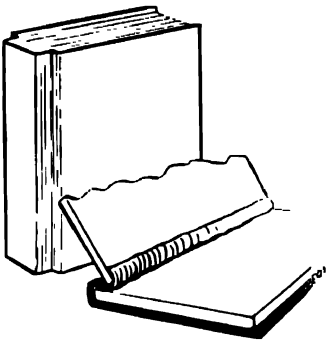


Fig. 11–27. The strongest binding, side thread sewn, flat back.

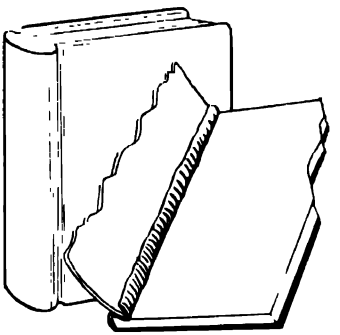


Fig. 11–28. Side thread sewn, but using rounded back.

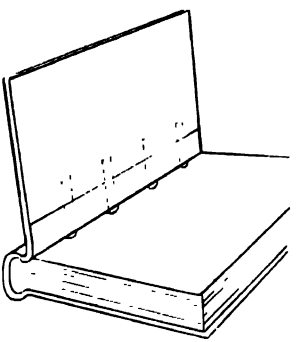


Fig. 11–29. Tapes through drilled holes for textbooks.

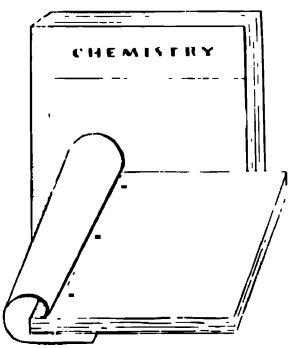


Fig. 11–30. Side wire stitched, cloth back for work book.

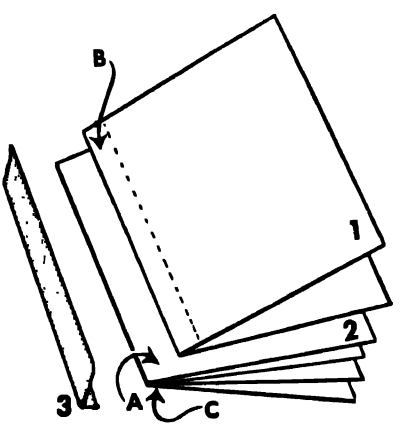


Fig. 11–31. The strengthening of Smyth-sewed books by muslin reinforcing the first and last signatures, the points of greatest strain. This should be done for all heavy books or those that will receive much handling.

The endpaper (1) is pasted to the end signature (2) along the binding edge (A). A muslin strip (3) is affixed to the endpaper along the edge (B) to dotted line and extends around signature (2) at (C). Joint extends on endpaper $\frac{3}{4}$ inch and around signature about $\frac{1}{4}$ inch.

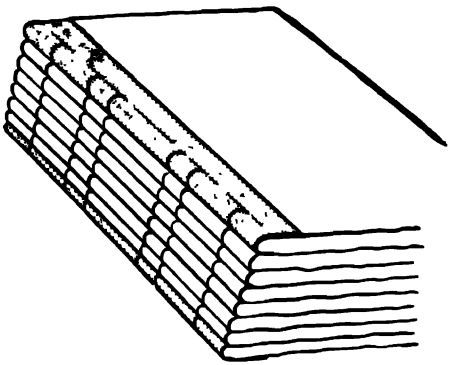


Fig. 11–32. The front and the back muslin joints of the sewed book.

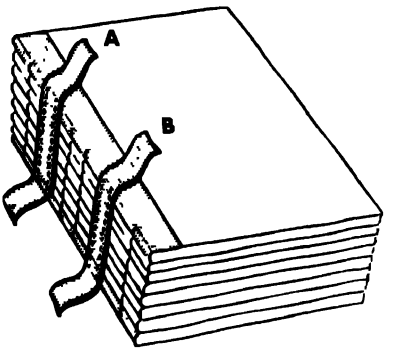


Fig. 11–33. Tape reinforcing. During the sewing together of the book signatures, two or more tapes (A and B) are sewn to them and extra tape is folded down between each book to permit cutting and taping onto front and rear endsheets. In edition binding, muslin reinforcing has practically replaced tape because of cost and speed.

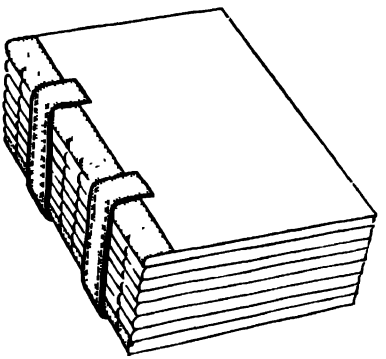


Fig. 11–34. The fully reinforced book. This method is used mostly on blank books.

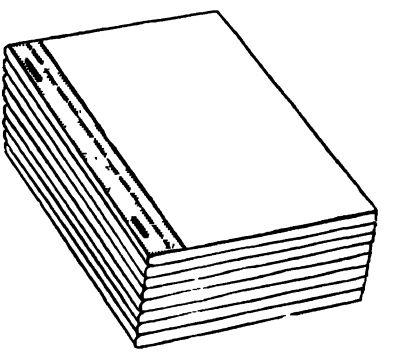


Fig. 11–35. The finished book.

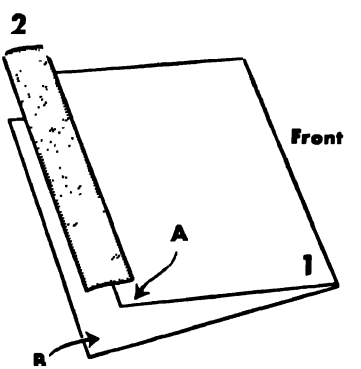


Fig. 11–36. The use of visible twill or canvas joints. These must be utilized on side-sewed books to get the full benefit of the strength obtained from the sewing. The endpaper (1) is folded along the front edge with the cover paste-down leaf shorter than the fly leaf. The twill joint (2) is affixed along two edges of endpaper (at A and B).

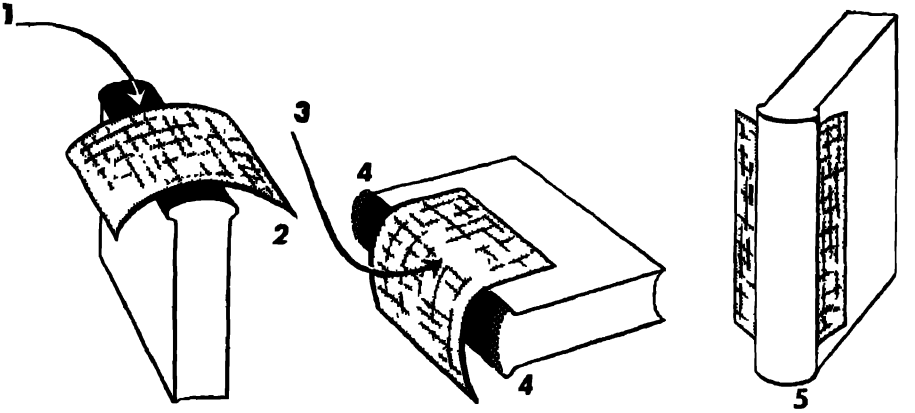


Fig. 11–37. Lining and headbanding. A coating of flexible glue is applied over the entire binding edge (1) and a piece of crash cloth (2) placed over the glued back. The cloth extends loosely around the endpapers. Another coating of glue is applied to the back as at (3). Headbands (4) are then affixed. A piece of kraft paper the full width and length of the backbone is then affixed over it (5).

page of each book; this glues the cover to the page and the backbone more securely, especially when the backbone is narrow.

Thread sewing can be done, rather expensively, in saddle stitching (with thread replacing wire) for greater permanence. This is a slow operation employing a cloth strip applied on the outside cover in order to hide the thread; it is found on heavier books with glued covers like those that are side-wire stitched. Signatures for this process are gathered together and run through a sewing machine.

Thread sewing is considerably more expensive than wire, but also more advantageous. The appearance is much neater, since the book looks case-bound, except for the cover. The binding is less conspicuous, which is desirable, since binding is purely functional and should not receive much attention. A sewed book opens almost completely flat, overcoming the difficulty entailed with side stitching. For a medium-run high-grade job, where expense is no object, the sewed pamphlet is suitable and satisfactory.

Trimming. The final step in the production of a pamphlet is the trimming. Essentially this is nothing more than paper cutting, although problems do arise. Most important of these is the irreparable breaking of corners at the binding side of saddle-stitched books, due to the gaps caused in every pile by the curve of the back. As the arc increases with the thickness of the book, the amount of the break grows.

This danger can be eliminated in only one way, although it can be minimized by changing the pile size and having the knife cut into the

backbone instead of away from it. In the case of particularly serious breaks, the books can be trimmed open, top and bottom, then closed by a trimmed front. This is a slow and expensive operation not guaranteed to cut precisely square, but it will halt the break.

Packing. This is the last operation performed in the bindery. To prevent damage after shipping as the result of poor packing, all printed matter should be banded in uniform lifts of convenient size in corrugated containers.

A 200-text corrugated board carton, weighing 50 to 65 pounds, is the best unit for the normal job. It is less bother in handling than bundles or cases, and the labor cost for packing is lower, as are transportation charges.

DIE-CUTTING

When lithographed sheets for display advertising arrive at the finishers, the following operations are performed:

A steel-rule die is made from the lithographed and varnished sheet. The sheet is then mounted on cardboard and hydraulic pressure is applied. Cardboard that is in poor condition is first treated to make it mountable. The die is prepared on a press with leveled-off heavy areas, which enables the die-cutter to apply pressure uniformly over the die. Any crease required on the display is taken care of by counters applied on the press plates. The sheets are die-cut according to the original guides set by the lithographer, or color guides are followed where the originals have been tampered with or cut away. Waste materials are pulled away from the finished sheet and blemishes on the display are scraped off. Easels are then applied to the display; special gluing, score-breakings, stitching, eyeleting, and other special operations necessary to the finished display are performed. Slip-sheeting is done and a careful examination is made before the displays are placed in corrugated folders, cartons, or cases, or are stored in bulk on skids for distribution to other quarters.

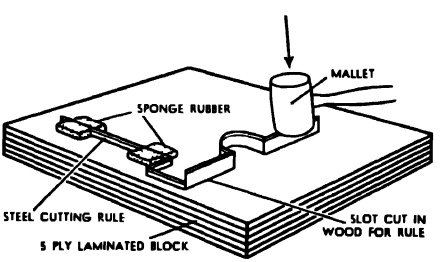


Fig. 11–38. Steel-rule diemaking. The copy is hand cut.

On a small-run job, from a week to ten days is required to complete the operations mentioned above, if the job is put into work as soon as it arrives at the plant. However, there are nearly always jobs scheduled ahead.

The first step in producing a display is to select from the visuals the

art work that will be reproduced. Specifications are then set for the finishing of the display; the thickness of stock, size of easel, and method of packing for distribution are decided at this point. Material costs run to about 50 percent of the total display cost. Lighter (and therefore less expensive) boards with multiple scores are suitable for displays, since the scores will keep the board rigid and eliminate warping. Easel sizes vary from two thirds to three fourths of the size of the display, with short-grain display, of necessity, continuing an easel to the top of the card.

Size of the press used for the die-cutting operation depends on the size of the sheet and the intensity of pressure required for cutting. The sizes of standard presses are: 14 × 22, 20 × 30, 27 × 41, 46 × 67.

To accommodate the newest lithographic presses a few mounters are equipped with a 50 × 80 press.

Stock for these jobs should be, at the very least, 70-pound litho, coated for offset, and should be completely dry before going on to the finisher.

The printing and litho plates are more expensive than the dies, and are the determining factor in selecting the size of sheet to be used. All sheets require ¾-inch grippers, ½-inch side guides and ½-inch on opposite ends of the guides. If there is any difficulty with this, the finisher should be consulted and make the final decision on the gripper size. Margins do not vary, regardless of the size of paper. All waste material should be left to the side of the sheet opposite the guide, to be cut away before mounting. To maintain register and allow for tolerance in variations, a color bleed of at least ⅛ inch (¼ inch between two units) must be allowed. Bleed colors should be mitered wherever they meet.

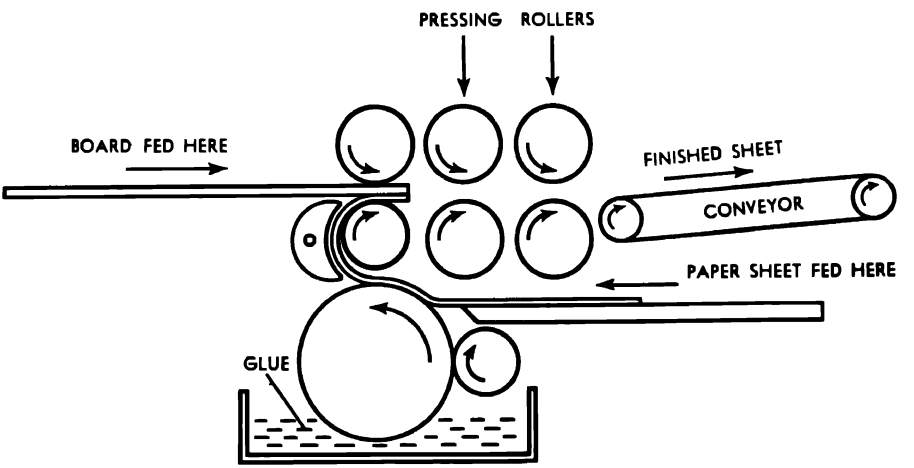


Fig. 11–39. Jersey mounting machine. Applies the back liner and the face sheets in two separate operations.

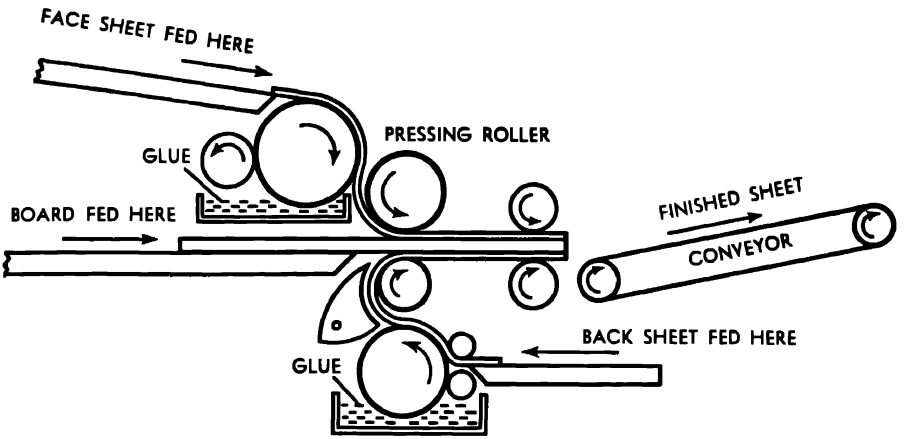


Fig 11–40. Duo-mounting machine. This applies both the back liner and the face sheets simultaneously.

and come to a point at the cutting line. Bleed is not necessary on a tight layout where two subjects can be laid together, provided that the single knife separates two cards of the same color.

Precautionary measures that should be taken for layouts are: bleed and the color it bleeds must always be the same color; cutting marks should never be printed; avoid die-cutting on the edge of two different colors; when a large sheet is being used, never spread the working area, but keep it as condensed as possible.

Besides converting paper and reproduction into cardboard display, the mounter gives the display such valuable attention getters as shape, dimension, and realism. To accomplish this, he must die-cut the mounted sheet into a shape designed to embellish the attractiveness of the art work, apply three-dimensional principles, affix the product directly to the display or all of these. Careful attention is given to the grains of the board, the lithographed sheet, and the back liner in order to limit the possibilities of warpage, and keep shrinkage in one direction and under control. The lithographer can assist in this process by seeing that all the displays run with their larger dimension, the length of the sheet, and with the long grain of the paper. Glues are selected according to the type of paper and the prevailing weather conditions.

Best results are obtained by allowing adequate drying time between mounting, die-cutting, and finishing.

BINDING AND DIE-CUTTING TERMS

Accordion Fold. Accordion folds are made by starting on one side of the sheet, as on over-and-over, and continuing toward the other side, with the turning direction reversed on each fold. Accordion folds are

common on heavy stock and on elongated maps and illustrations, as the sheet is easier to open and close, and reading matter appears in sequence across the sheet, facilitating its handling.

Backbone. The back of a bound book connecting the two covers is called the "backbone"; it is also called the "shelfback" or "spine."

Binding Edge. The binding edge is the back of a book, where the sections or signatures are sewed together. To this edge are attached any reinforcements necessary to strengthen the book and hold it in the cover.

Brochure. A brochure is a pamphlet bound and sewed in book form.

Collating. Collating consists of inspecting sections of a book to justify their arrangement and full count.

Folio. The term "folio" refers to any of the following: (1) a ream or sheet of paper in its full size; (2) a basic sheet of paper that has been folded once, producing four pages; (3) a book size of paper measuring approximately 12 × 15 inches; or (4) the page number printed on a page of type in a book.

Format. The general make-up of a book, magazine, or newspaper as to size, type page, margins, binding, etc., is called its "format."

French Fold. A French fold is a sheet of paper printed on one side only, and so folded as to expose the printing. It usually has a closed head.

Gathering. The process of collecting, by machine or by hand, printed signatures of a book in the order in which they are to be bound is called "gathering."

Insert. An insert is a page, either type matter or illustration, printed separately from the regular sections and tipped in later between the pages.

Lacing. Lacing consists of the bookbinding operation in which the cords or bands are drawn through holes pierced in the boards of the binding, and the projecting ends are frayed out preparatory to being hammered down smoothly.

Laminating. Laminating is the process of applying a sheet of plastic film or acetate to a printed sheet.

Looper. A device, called a "looper," is used for the lock stitching that catches the thread as it is passed through the section by the sewing-machine needles.

Overhang Cover. An overhang cover is a book cover that is slightly wider and longer than the pages enclosed; it is also called an "extension cover."

Parallel Fold. When forms are printed "two-up" the parallel fold is used, two pages just alike, one on top of the other. This method binds two sheets at once and, when cut in half, makes two separate books or sheets.

Perfect Binding. This term is usually applied to magazines. It is a method of machine binding in which the gathered signatures are fed into the binder, automatically clamping the magazine; the back folds are cut off, leaf edges roughed up and glued, paper applied, and the three edges made ready for trimming. It is also used on small, paper covered books.

Right-angled Fold. A right-angled fold 16 is called a "straight 16 form." Three folds are made, each being at right angles to the preceding one. A 32-page form is folded in the same manner as a 16-page one, but has four folds. Machines will also fold one 32 or two 16's inserted. An insert is one 16-page form inserted inside of another 16-form, called the "outsert." The same can be done with larger and smaller forms.

Saddle Stitch. This is a method of stapling or sewing a booklet or pamphlet in which the wire or thread will show on the back and in the middle fold.

Scoring. This is the production of a score or crease in a sheet of heavyweight paper or board by pressing it between two metal surfaces, one of which has a recessed groove and the other a tongue. The score may be produced by scoring plates or by scoring rollers, and is made along the line on which the sheet is to be folded. It alters the sheet structure in such a way that it will fold more readily, with less tendency to crack or break.

Side Stitch. Side stitching consists of stitching with thread or stapling with wire through the side of two or more folded sections of booklets or pamphlets.

Side Wire Stitched. A pamphlet bound with a glued-on back, a hinged cover, and cut flush is side wire stitched. It is a firm binding, but does not open as flat as a saddle stitch binding.

Signature. The signature is the letter or number placed at the bottom of the first page of each section (usually trimmed off and not appearing in the bound work) to serve as a guide for the binder in gathering. In common usage the term is also applied to the sections of the book proper on which the signature marks are printed.

Singer Sew. This is a stitch in which the thread passes through the entire book at the left-hand margin. It is usually reinforced with twill or muslin strips.

Smyth-sewed. This is a method of binding providing a flat pamphlet when opened.

Tipping in. Tipping in is the operation of pasting into a book a separate leaf, an illustration, or a selection; it is also known as pasting in.

Wire Stitching. The process of sewing leaves of pamphlets and booklets together with wire is called "wire stitching."

Wrap-around. This is a bookbinding term referring to the folded sheet that folds around another signature. The inner section is an insert while the outer section is known as a wrap-around.

12

PRINTING TERMS

On the following pages are brief definitions of words, processes, and equipment that are not covered elsewhere in this book and with which the production man should be familiar.

Aniline Printing. This letterpress process uses an ink containing an aniline dye as its chief ingredient. The press used for aniline printing is much simpler than the conventional machines because of the liquid state and quick-drying qualities of the ink. Only two rubber rollers are required, one running partially submerged in the fountain, the other transferring the ink to the plate. This process is used for printing bread wraps, confectionery wraps, paper bags, paper milk containers, cellophane bags and wraps, foil bags and wraps, bottle wraps, and gummed tape. The ink used is odorless.

Aquarelle. An aquarelle is a colored picture produced by printing the subject or reproduction in ink from a key plate and then applying water color with brushes through stencils which are placed over the print. Different stencils are used for different colors.

Broadside. A large printed sheet intended as a circular, folded into a size convenient for mailing, is called a "broadside." It is distinguished from a folder by the fact that its printed matter runs across the sheet, regardless of the fold.

Cylinder Press. This printing press consists of an oscillating flat bed passing alternately under inking rollers, and a rotating cylinder pressing the paper against the moving type.

Deep Etch. Deep etch is a method of making lithographic press plates which results in the image being almost imperceptibly below the surface of the grain on the plate.

Deep-etch Halftone. This is a letterpress halftone in which the etching is especially deep, to reduce the danger of its filling in and to better adapt the plate for printing on rough surfaces.

Direct Lithography. In this planographic printing process, the paper to be printed comes into direct contact with the stone or metal plate. The design to be printed is drawn, photographed, or transferred to the surface of the stone or metal with a special crayon or ink; this surface is then subjected to the action of a weak acid that hardens the ink. The printing process requires the moistening of the surface with water, which is absorbed by the blank parts and repelled by the hard greasy lines of the design. Printing ink is then rolled over the plate and is repelled by the wet parts, but adheres to the ink-drawn design. This process, still used for cigar bands and posters, has been largely replaced by the offset printing process.

Doctor Blade. A doctor blade is a knife edge which wipes excess ink off the surface of the engraved plate in intaglio printing.

Dot Etching. Dot etching decreases the size and shapes the outline of the silver dots on photolithographic screen positives. It is usually done on the positive and provides the color retoucher with an excellent method of lightening tones. Based on the principle that the dots in a halftone consist of a hard core and a less dense halo, the application of chemicals to the positive causes the less dense halo to disappear while the denser core is retained. This reduces the size of the printing dot, increasing the space between dots. When the job is printed, more white paper shows between the smaller dots. The eye viewing this blends the dots and paper into a lighter color than if the dots had not been reduced in size. Dot etching can be done in a tray. To dot etch merely portions of the positive, the chemical may be applied locally by brush. Since this work is usually done on a positive, the dot etcher can see to what degree he is changing tone values in a set of separation positives.

Frisket. A piece of paper placed over part of the form to prevent that part from printing is called a "frisket." It is used to cover bearers and dead metal when proving photoengravings.

Grippers. The grippers are the metal fingers attached to the platen on job presses. The fingers hold the paper in place and remove it from the type form after the impression has been made. On cylinder presses the grippers carry the sheet of paper around the impression cylinder.

Harris Press. The Harris-Seybold Company is a manufacturer of lithographic and letterpress presses as well as of other graphic arts equipment.

Sizes of standard Harris presses range from a maximum sheet size of 17 × 22 to 50 × 68.

Impose. To impose in printing is to lay out a form of the printed pages appearing on two sides of a sheet so that the folios follow in proper sequence after folding, and to arrange the correct gripper and guide edges on the sheet before it is machine-folded.

Impression Cylinder. An impression cylinder is the roller of a printing press which presses the paper into contact with the form or blanket cylinder.

Ink Fountain. A container or well, the ink fountain, supplies ink to the inking rollers.

Intaglio Printing. This printing is from plates on which the image is intaglio or sunken below the surface. The image consists of regular (screen) or irregular (grain) etched depressions, or lines engraved by hand. These are filled with ink and the plate surface is wiped clean with a doctor blade. This class of printing includes rotogravure, sheet-fed gravure, photogravure, offset gravure, aquatint, mezzotint, copper and steel engraving, etching, and stipple engraving.

Job Press. A job press is a small printing press, usually of the platen type, upon which small jobs are done.

Kelly. Kelly printing presses are made in several styles of bed and cylinder types. They are manufactured by American Type Founders, Inc.

Linoleum Blocks. These are relief surfaces or blocks cut from linoleum. In recent years engraving from linoleum has become popular, and such engravings have been used to some extent for poster and other flat-color printing. The process is similar to that of wood-block cutting, and is done entirely by hand. Woodcarvers' tools, gauges, and knives with long beveled edges are employed. By using a good quality of commercial linoleum of various textures (about ½ inch in thickness), different effects—smooth, stippled, or grained—may be produced in printing. Linoleum blocks are very durable and can be electrotyped in order to produce duplicates.

Lock-up. The lock-up consists of putting live matter (type, or plates, or both) into a chase, and planing and adjusting the quoins and furniture so that it can be placed on the press for printing.

Make-ready. Make-ready is the process of getting the form ready for printing by preparing all parts to give an equal impression.

Make-up. This is a general term for taking the type from the galleys, putting it into page form, inserting illustrative cuts, dividing the matter

into page lengths, and adding running heads, titles of subdivisions, folios, footnotes, etc.

Miehle. These high-speed cylinder, one- and two-color cylinder, and perfecting letterpresses, offset-lithography presses, and sheet-fed gravure presses are manufactured by the Miehle Printing Press and Manufacturing Company.

Mimeograph. This is a trade name applied to one kind of a stencil duplicator. It is a duplicator apparatus by which reproduction of typewritten and illustrative material may be produced by the use of a stencil. The principal part of the machine is a perforated revolving cylinder, usually carrying an inking device on the inside; a felt ink-pad on the outside of the cylinder transfers the ink to the stencil, which in turn transfers it to a sheet of paper. It may be used for the reproduction of typewritten matter, ruled forms, line drawings, charts, graphs, music, etc. Many grades of paper can be used on a stencil duplicator.

Nonprinting Area. The blank areas of a printing surface are called the nonprinting area. The term usually applies to depth of screens, type bowls, etc., and has its own level below the printing surface as distinguished from the space level.

Off-side. On a printed sheet, the off-side is the side farthest away from the gripper and guide edges. It may be also the first side on a printed sheet.

O.K. Proof. O.K. proof is corrected and ready for the compositor.

Optak. This is a gelatin printing process stemming from aquatone and featuring a 400-line screen.

Out of Register. A sheet is out of register when the pages on both sides of it do not back each other accurately. When two or more colors of a job are not in proper position, the job is out of register.

Overprinting. Overprinting is the application of a varnish or lacquer to printed material from typographic or lithographic processes by brushing, spraying, or roller-coating.

Ozalid. This method of photocopying produces positive copy in dark red, sepia, blue, or black on white. The sensitized paper is exposed to the copy and dry-developed by ammonia fumes. No washing or drying is required. The copy cannot be enlarged or reduced, but reproduction can be on wide variety of papers, cloths, foils. Prints are produced at the rate of 20 or 30 per minute in sizes up to 54 inches wide by any length.

Perfecting Press. A perfecting press prints on both sides of the sheet or web and delivers folded signatures. Such presses are rotary in principle and are widely used in magazine and newspaper printing.

Perfector Press. This flat-bed two-cylinder press prints on both sides of a sheet in one feeding.

Plate Cylinder. The plate cylinder is the roller of an offset printing press which bears the printing plate.

Plateless Engraving. Plateless engraving is a typographic printing process in which densely pigmented ink on printed sheets is dusted with a powdered resin of low melting point. After surplus powder has been blown from the paper, heat is applied to fuse the resin and yield characters which are raised above the paper. The process is also known as thermography.

Platen Press. A platen press is any press that gives an impression by bringing together two flat surfaces, one of which is called the bed and the other the platen. This style of printing press is used for small work and prints a single sheet by pressing it against an entire frame or chase of type at the same time.

Print and Hold. "Print and hold" are the instructions placed on work that is to be held after printing until delivery is requested.

Progressive Proofs. Progressive proofs are made from the separate plates used in color-process work, to show the sequence of the printing and the result after each additional color has been applied. They are furnished to the printer by the engraver.

Register. (1) Exact correspondence in the position of lines, columns, pages, or other printed matter on opposite or reverse sides of a sheet of paper or in their position relative to other matter already printed on a sheet means they are in register. (2) Material is in register when it is printed in correct position to correspond with other printed matter. The term is used chiefly in connection with the relationship between one color plate and another of the same set.

Reprint. (1) A reprint is a new printing of a work already published. (2) The term is sometimes used to indicate an edition of a work cheaper than the original—also called rebinds and popular copyrights. (3) Or it can refer to matter printed in late editions of newspapers that has not reached readers of early editions, and is therefore available for use in early editions of the following issue.

Reproduction Proofs. Proofs of exceptional cleanliness and sharpness to be used as copy for reproduction are called "reproduction proofs."

Rivers. Streaks of white between words in a printed paragraph, caused by wide or improper spacing, are called "rivers."

Roller Bearers. Bearers, usually of wood, are placed in a job-press form to cause the rollers to rotate.

Roll-feed. Roll-feed means to take paper from a roll instead of using single sheets, as on rotary presses.

Rotary Press. A rotary press is a high-speed press which passes continuous webs of paper between an impression cylinder and the curved printing form on the plate cylinder. Rotary presses are used for all newspaper printing, periodicals of large circulation, and occasionally for books of large run. This press is also called a web press.

Rubber-plate Printing. This is letterpress printing from molded or vulcanized rubber plates on burlap, cellophane, glassine, cloth, paper, wood, metal, or glass. Advantages claimed for rubber-plate printing include adaptability to hard, grained, or rough printing surfaces; good quality consumption, little wear and tear on printing presses; kiss impression in printing, quick ink-drying qualities; high-press speeds; nonstretch, elimination of smashups from buckled sheets or loose plates; avoidance of embossing or punchthrough on the back of the sheet; accomplishment of special effects frequently desirable in letterpress or relief reproduction work, and plate economies.

Run. The number of copies printed or folded on a job is called the "run", also the term can mean the number of impressions made from a press plate.

Sheet-fed. When paper is fed in single sheets instead of from a roll, it is sheet-fed.

Short Run. A short period of operation, as of a press, is a short run.

Split-color Printing. Split-color printing is a technique particularly adapted to jobs requiring the printing of a great number of colors at one time, such as color sample cards, etc., known variously as split-fountain, split-color, or rainbow printing; the exact methods vary from plant to plant. Some plants use color plates for this process. The ink fountain is split, or so divided that different parts of it feed different colors of ink to the rollers and the form. From this point on, three different production techniques are in widespread general use. In one, the steel vibrator rollers are cut to correspond with the channels of the fountain. This system eliminates cutting of the rollers and permits the printing of different colors only $^{3}/_{8}$ inch apart, without blending. Brass collars for the steel

rollers permit their reconversion to one-color work. Another process of split-color printing does not require the use of special rollers. In this system, the composition rollers are actually cut in the pressroom to fit the specific job in hand. While this often means that the rollers are useless after the completion of the job for which they were cut, excellent results can be obtained. A third method is known as rainbow printing, because no rollers are split and the various colored inks in the fountain are allowed to blend. While the uses of this technique are limited and the blending is not uniform throughout the run, it is a method of obtaining eye-appealing multicolor effects at relatively low cost.

Stone Proofs. Stone proofs are those pulled from type on the stone or metal-top table when the locked-up form is ready for the foundry or press.

Webendorfer. This is the name of a line of offset presses manufactured by the Webendorfer Division of American Type Founders, Inc.

Web Press. *See* Rotary Press.

Wet Printing. Any printing process where wet ink is printed on top of wet ink is called "wet" printing. It occurs in two-color printing when, in a single revolution of the press, a first-down color has superimposed upon it a second color, usually black. It occurs in four-color printing when, in a single press revolution, two or more of the four inks are superimposed in the same area of the paper. One large impression cylinder is used to accommodate five plate cylinders. Four of the plate cylinders are used in process color printing. The fifth cylinder is used, as the job necessitates, to put the second color on two color pages, or to add special effects to the process pages. The paper travels around the impression cylinder and comes in contact with the plate cylinders in rapid succession, so that each layer of ink is transferred to the paper while the preceding colors are still wet. Because each plate cylinder does not have its own impression cylinder, less press make-ready is possible in this method than in standard dry-printing procedure. Speeds of these presses range from the relative slowness of 1000 revolutions an hour to 12,500 revolutions an hour or more. This process requires special paper, special inks, and specially prepared engravings.

Table I

Character-per-pica

COPY-FITTING CHARTS

The boldface column on the left is an alphabetical listing of approximately 850 type faces. The second column lists the manufacturer of the face.

The remaining columns, as the headings indicate, show the character-per-pica count for the lower-case letters of all the faces in sizes from 5 point to 24 point. (Allowance has been made for occasional use of capitals and of the frequency of appearance of wide and narrow letters.)

To use these tables correctly, locate the intersection of the column showing the desired type face and the column showing point size. Read off the character-per-pica count. Multiply this by the number of picas in the type line to determine the number of characters of that face and size that will fit the line. This in turn can be multiplied by the number of lines in the paragraph to determine the characters per paragraph.

In using these tables, be sure you refer not only to the specified face but to the specified manufacturer as well. For example, Linotype Baskerville in 6-point size has a count of 3.8 whereas the American Type Founders Baskerville Roman has a count of 4.96, a difference of almost 30 percent.

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Adonis	A					3.29		2.97		2.45	2.12		1.68	1.22
Adonis	I							3.11		2.57	2.26		1.72	
Ad Type No. 163	M			3.4		2.79		2.38		1.98				
Airport Condensed Title Capitals	BL												1.26	.99
Airport Medium	BL			4.38		3.72		2.95		2.48	2.11			1.34
Airport Bold	BL			3.72		3.17		2.41		2.01	1.75			1 04
Airport Semi-Bold	BL			4.02		3.49		2.67		2.31	2.04			1.24
Alternate Gothic 1	A			5.65		4.71		3 69		3.32	2.83		2.33	1 8
Alternate Gothic 1	I					4.39		3.8		3.29	2.8		2.35	1.78
Alternate Gothic 2	A			5.14		4.27		3.24		2.96	2.48		1.97	1.56
Alternate Gothic 3	A			4.37		3.77		2.85		2.51	2.13		1.75	1.35
American Text	A												2.06	1.66
Announcement Italic	A			3 82		3.34		2.87		2.55	2.31		1.79	1.39
Announcement Roman	A			3 93		3.37		2.97		2.61	2.35		1.85	1.42
Antique No. 1	Li			3 51		2.8	2.59	2 43		2.08	1.8		1.51	1.12
Antique Bold Condensed No. 145	M			3.4		2.79		2.38		1.98				
Antique Modern No. 26	M	3.99		3.4	2.97	2.79	2.65	2 38	2.17	1.98				
Antique Modern Condensed No. 76	M	5.76		3.85	3 37	3.24	3 00	2.69		2.25				
Antique Shaded	A					2.36		1.9		1.69	1.4		1.12	.87
Antique No. 1 with Italic	I			3.52	3.2	2.81		2.43		2.08	1.81		1.51	1.12
Artcraft	Lu							2.48		2.12	1.88		1.44	1.14
Artcraft Bold	Lu			3 5		2.96		2.45		2.05	1.79		1.37	1.09
Artcraft Italic	Lu							2 56		2.15	1.81		1.5	1.17
Atlantic No. 35	M			4.12		3 34		2.65		2.44				
Atlantic Italic No. 35	M			4 48		3 69		2.9		2.42				
Author's Roman	A			3.84		3.19		2.71		2.16				
Bam Stencil Capitals	RSW												.73	.57
Baskerville	Li			3.8	3.6	3.22	2.96	2.64	2.46	2.3	2.01	1.71		
Baskerville No. 353	M			4.08	3.66	3.25	3.16	2.76	2.5	2.3	2.11		1.76	1.29
Baskerville Bold	I			3.83		3.14	3.03	2.73	2.58	2.29	2.03			
Baskerville Bold	Li				3.6	3.22	2 96	2 64	2.46	2.29	2.05			
Baskerville Bold No. 453	M					2.97	2.79	2 52	2.29	2.1				
Baskerville Italic	A			5.		3.85		3.52		2.85	2.4		2.05	1.72
Baskerville Italic	I			3.92		3.18	3.06	2.78	2.63	2.33	2.03		1.8	1.3
Baskerville Italic 353	M			4.78	4.3	3.79	3.58	3.22	2.93	2.69	2.46		2.05	1.49
Baskerville Roman	A			4.96		3.78		3.23		2.6	2.21		1.87	1.39

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Bauer Text	B					3.56		3.00	2.65	2.48	2.24	1.9	1.66	1.24
Bell No. 402	M					3.33	2.99	2.83	2.58	2.36				
Bell Gothic	Li			4.56	3.89	3.5								
Bell Italic No. 402	M					3.61	3.22	3.07	2.79	2.55				
Benedictine Book	Li			4.08	3.56	3.12	2.82	2 52	2.31	2.12	1.84		1.52	1.16
Benton	A			3.63		3.12		2.73		2.28	1.99		1.58	1.19
Bernhard Booklet	A					3.56		2.98		2.53	2.15		1.73	1.31
Bernhard Cursive	B									3.44	2.87	2.6	2.39	2.13
Allow for swashes														
Bernhard Cursive Bold	B										2.71	2.43	2.07	1.95
Allow for swashes														
Bernhard Fashion	A									3.04	2.56		2.05	1.58
Bernhard Fashion	I									2.94	2.54		2.03	
Bernhard Gothic Extra Heavy	A									2.18	1.81		1.44	1.07
Bernhard Gothic Heavy	A					3.34		2.73		2.41	2.03		1.62	1.21
Bernhard Gothic Light	A			4.3		3.65		2.95		2.61	2.15		1.77	1.31
Bernhard Gothic Light Italic	A			4.57		3.82		3.13		2.72	2 32		1.88	1.41
Bernhard Gothic Medium	A			4 26		3.75		2.96		2.64	2 29		1.75	1.33
Bernhard Gothic Medium Condensed	A									3.35	2.74		2.19	1.68
Bernhard Gothic Medium Italic	A			4.26		3.61		2.94		2 61	2 17		1.74	1.31
Bernhard Italic	B							3 45		2.97	2.7	2.36	2 16	1 69
Bernhard Modern Bold	A					3.43		2.73		2.35	1 96		1.58	1.2
Bernhard Modern Bold Italic	A					3.46		2 92		2 45	2 1		1 64	1.27
Bernhard Modern Italic	A					3.71		3.06		2.63	2 25		1.82	1.4
Bernhard Modern Roman	A					3.59		2.99		2.54	2.15		1 74	1.31
Bernhard Roman	B							3.55		3.03	2.74	2.44	2.14	1.69
Bernhard Tango	A												2.04	1.58
Beton Bold	B					2.32		2.52		2 05	1.79	1.49	1.4	1.11
Beton Bold	I					3 48	2.97	2.65	2 35	3.12	1.91		1.48	1.20
Beton Bold Condensed	B										1.99	1.67	1.56	1.23
Beton Extra Bold	B										1 63	1.31	1.22	1.02
Beton Extra Bold	I					2.42		2.04			1.7	1.49	1.22	1.02
Beton Extra Bold Italic	I					2.35		1.99		1 67	1.45		1.21	1.00
Beton Light	B					3.94		3.02		2 46	2 06	1.75	1.66	1.36
Beton Medium	I					3 49	2.99	2.64	2 35	2.13	1 93		1.53	1.2
Beton Wide	I					2.42		2 04		1.7	1.49		1.22	1.04
Binny Old Style No. 21	M	4 11	4.11	3 82	3 33	3 13	2 96	2.6	2.36	2.22				

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Binny Old Style Italic No. 21	M	4.46	4 46	4.15	3.63	3.41	3.22	2 83	2.58	2.43				
Bodoni	A			4.3		3.18		2.63		2.36	2.12		1.65	1.28
Bodoni	B					3 91		3.24	3.04	2 63	2.19	1.83	1.63	1.36
Bodoni	Li			4 18	3.56	3.13		2.59		2.36	2.09	1.88	1.63	1.28
Bodoni	APL												1.66	1.28
Bodoni No. 175	M	4.44		3 83	3.33	3.15	2.96	2 66	2.41	2.23	1.89		1.46	1.10
Bodoni No. 375	M			3 95	3.55	3.15	2.96	2 66	2.42	2.23	2.11		1.64	1.28
Bodoni Black	Lu			2 97		2.34		2.05		1.86	1.6		1.21	.89
Bodoni Black Italic	Lu									1.69	1.45		1.12	.84
Bodoni Bold	A			3.92		2.95		2.5		2.19	1.97		1.53	1.18
Bodoni Bold	APL												1.53	1.2
Bodoni Bold	B					3.52		2.98	2.7	2.44	2.05	1.64	1.55	1.26
Bodoni Bold	I			3 72		2.91		2.45		2.18	1.95	1.74	1.53	1.52
Bodoni Bold	Li			3 7	3.36	2.89		2.44		2.17	1.95		1.53	1.22
Bodoni Bold	Lu			4 44		3.52		2.78		2.46	2.05		1.62	1.18
Bodoni Bold No. 275	M				2.97		2.65		2.23		1.77		1.27	
Bodoni Bold Cond.	I												1.93	1.52
Bodoni Bold Cond.	Li												1.93	1.52
Bodoni Bold Italic	A			4 02		2 95		2.51		2.24	1.98		1.57	1.21
Bodoni Bold Italic	APL												1.56	1.23
Bodoni Bold Italic	Lu			4 17		3.42		2.66		2.33	1.96		1.53	1.1
Bodoni Bold Italic No. 275	M			3.43		2 82		2.41		2.				
Bodoni Bold Italic Recut No. 975	M			3.65	3 28	2 88	2 71	2.45	2.23	2.13				
Bodoni Book	A			4.52		3.42		2.91		2.58	2.34		1.83	1.43
Bodoni Book	Li			4.21	3 71	3.31	2.98	2.76		2.5	2.25		1.83	1.47
Bodoni Book No. 875	M			4.3	3.78	3.33	3.15	2.85	2.7	2.58				
Bodoni Book Italic No. 875	M			4.59	3.93	3.55	3.33	2.99	2.85	2.71				
Bodoni Book with Italic	A			4 66		3.46		2.96		2.66	2.35		1.83	1.42
Bodoni Book with Italic	I			4.21		3.32		2.78		2.5	2.26			
Bodoni Campanile	Lu										2.97		2.31	1.72
Bodoni Campanile Italic	Lu													1.64
Bodoni Italic	A			4.28		3.17		2.71		2.39	2.14		1.68	1.3
Bodoni Italic	APL												1.7	1.33
Bodoni Italic	B					3.98		3.31	3.	2.6	2.23	1.88	1.62	1.33
Bodoni Italic No. 175	M	4.83		4.25	3.63	3.44	3.22	2.91	2.64	2.43	2.07		1.57	1.2
Bodoni Italic No. 375	M			3.95	3.88	3.15	3.22	2.71	2.64	2.33	2.14		1.7	
Bodoni Light	Lu									2.75	2.31		1.75	1 28
Bodoni Light Italic	Lu									2.63	2.23		1.74	1.28

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Bodoni Modern	Lu			4 06		3 39		2 7		2 42	2.11		1.66	1.23
Bodoni Modern Italic	Lu			4 31		3 59		2 93		2.44	2 27		1 82	1.37
Bodoni Modern with Italic	I					2.42		1 97		1 56	1 43		1 17	9
Bodoni Open	A							2 59		2 32	2 07		1 61	1.25
Bodoni Poster	Li					2 34		2.		1 69	1 46		1 13	84
Bodoni with Italic	I			4 17		3 13		2 6		2 36	2 11		1.64	1 28
Bookface with Italic	I			3 69	3 41	2 95	2 9	2 6	2 36	2 1	1 81		1 46	1 01
Bookman	Li			3 71	3 4	3 11	2 88	2 6	2 37	2 21	1 84			
Bookman	Lu									1 97	1 56		1 24	.99
Bookman Italic	A			3 6		3 02		2 44		1 96	1 74		1.35	.95
Bookman Italic	Lu									1 78	1 48		1 23	.99
Bookman Old Style	A			3 59		3 18		2 67		2 24	1 89		1 42	.95
Bookman Old Style No. 98	M			3 68	3 33	3 15	2 98	2 61	2 44	2 23	1 87		1 42	.95
Bookman Old Style Italic No. 98	M			3 43	2 97	2 82	2 68	2 41	2.23	2.				
Britannic	BL										2 07		1 63	1 21
Broadway Condensed	A			2 94		2 55		2 13		1 86	1 55		1.24	.98
Bruce Old Style No. 20	M			4 11	3 66	3 32	3 04	2 79	2 43	2 23				
Bruce Old Style Italic No.	M			4 47	4 0	3 64	3 31	3 06	2 69	2 64				
Brush	A									2 65	2 25		1 83	1 41
Bulmer Italic	A			4 06		3 46		3		2 67	2 37		1 9	1 46
Bulmer Roman	A			3 8		3 24		2 82		2 51	2 24		1 76	1 36
Cairo	I			3 57		3 03		2 55		2 09	1 78		1 46	1 13
Cairo Bold	I			3 52		3 05		2 58		2 07	1 78		1 4	1 11
Cairo Bold Condensed	I					3 45		2 97		2 46	2 11		1 76	1 42
Cairo Bold Italic	I			3 52		3 02		2 54		2 05	1 75		1 4	1 1
Cairo Extra Bold Condensed	I							3 00		2 46	2 11		1 73	1 41
Cairo Heavy	I			3 56		3 02		2 54		2 06	1 77		1 45	1 09
Cairo Italic	I			3 53		2 97		2 46		2 00	1 71		1 4	
Cairo Medium	I			3 56		3 13		2 63		2 07	1 76		1 45	1 11
Cairo Medium Condensed	I							3 00		2 46	2 11		1 73	1 41
Cairo Medium Italic	I			3 55		3 13		2 57		2 06	1 76		1.44	1.1
Caledonia	Li			3 72		3 12	2 87	2 63	2 44	2 26	2 00			
Caledonia Bold	Li											1.72	1 49	1.19
Camelot Old Style	A			3 76		3.23		2 57		2 37			1 75	1.29
Cameo	Lu									1 77	1 5		1.25	.98
Cameo Italic	Lu									1 58	1 34		1 15	.92
Canterbury	A									3 49	3 21		2 48	1.94
Card Italic	Li							2 80		2 51	2.10		1 58	

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Cartoon	B			2.71		1.91		1.5		1.3	1.1		.91	.63
Cartoon Bold	B			2.59		1.78		1.39		1.24	1.06		.86	.65
Caslon	Li				3.62	3.17	2.99	2.83	2.43	2.19	1.89		1.52	
Caslon No. 540	A			4.59		3.39		2.91	2 56	2.21	1.86		1.49	1.06
Caslon No. 3	APL			3 8		3.13		2.45		2.08	1.77		1.28	.96
Caslon No. 2	Li			4.16		3.35		2.7	2.46	2.27				
Caslon No. 3	Li	4 5		3.8	3 45	3.17	2 75	2.65		2.08	1 77		1.27	.96
Caslon No. 137	Li				3.8	3.33	2.97	2.66	2 43	2 21				
Caslon No. 540	A			4.59		3.39		2.91	2.56	2.21	1 86		1.49	1.06
Caslon No. 540 Italic	A			4.86		3 39		3.16	2.76	2 38	1 99		1 59	1.16
Caslon No. 3 Italic	APL			3 8		3 13		2 43		2 08	1.77		1.25	.98
Caslon American No. 637	M					3.78		3.15	2 69	2 36	2.11		1.7	
Caslon Bold	A			3 36		2.77		2.22		1.94	1.59		1.27	.98
Caslon Bold	Li	3 8		3 42										
Caslon Bold	Lu			3 26		2.77		2 45		2.02	1.71		1.31	1.02
Caslon Bold No. 79	M	3.69		3 43	3.	2.82	2.68	2.35	2.19	2.	1.59		1.27	.98
Caslon Bold Condensed	A			4 22		3 51		2.85		2.47	2 03		1.71	1.33
Caslon Bold Condensed	APL												1.66	1.33
Caslon Bold Condensed	Li										2 03		1.69	1.37
Caslon Bold Condensed	Lu			3.94		3.26		2.72		2.38	2 1		1.63	1.21
Caslon Bold Extra Condensed	Lu									3 13	2 64		2.06	1.61
Caslon Bold Italic	A			3 41		2.74		2 2		1.96	1 62		1.25	.97
Caslon Bold Italic	Lu			3 45		2.85		2 32		1.92	1.62		1.21	.92
Caslon Bold Italic No. 79	M			3 43	2.98	2 82	2 66	2 35		2.				
Caslon Cond. No. 113	M	5 4		4 5		3 38		2.85		2.45				
Caslon Heavy	A			3.28		2.89		2.29		2.	1 66		1.31	1.04
Caslon Heavy Italic	Lu										1.45		1.17	.9
Caslon Italic	Li												1.45	1.11
Caslon Italic American No. 637	M					4.22		3.56	3.00	2.64	2 36		1.93	
Caslon Italic—True-Cut	Lu					3.76		3 22		2.56	2.32		1.95	1.39
Caslon Light	Lu			3 29		2.83		2.48		2.17	1.82		1.36	1.06
Caslon Light Italic	Lu			4 17		2 87		2.51		2.23	1 77		1.40	1.05
Caslon New	A	4.61		3.89		3 15		2.43		2.09	1.74		1.35	1.04
Caslon New No. 537	M			3 78		3 15	2.69	2 36		2.11	1 75		1.36	1.04
Caslon New Italic	A			4 28		3.54		2 73		2 34	1.96		1.53	1.19
Caslon New Italic No. 537	M			4 22		3.56	3.	2 64		2 36				
Caslon Old Face	APL												1.83	1.28

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Caslon Old Face	**I**												1 86	1.32
Caslon Old Face	**Li**			4 39		3 62	3 19	3 05	2 8	2 4	2.13		1.86	1.31
Caslon Old Face Heavy	**Lu**			3 32		3 11		2 51		2 11	1 71		1.35	1.05
Caslon Old Face Italic	**APL**												2.02	1.58
Caslon Old Roman No. 78	**M**			3 84		3 1		2 57		2 25				
Caslon Old Roman Italic No. 78	**M**			3 84		3.1		2.57		2.25				
Caslon Old Style No. 471	**A**			4 23		4 04	3 32	3 29	2 79	2 44	2 17		1 75	1.3
Caslon Old Style No. 37	**M**			4 12	3 66	3 34	2 95	2 67	2 43	2 23	1 9		1.51	1.11
Caslon Old Style No. 137	**M**			4 11		3 32	3 04	2 65	2 41	2 23				
Caslon Old Style Italic No. 471	**A**			4 36		3 95	3 33	3 26	3 04	2 63	2 39		1.95	1.49
Caslon Old Style Italic No. 37	**M**			4 47	4 00	3 65	3 23	2 91	2 66	2 43	1 95		1.58	1.13
Caslon Old Style Italic No. 137	**M**			4 47		3 65	3 23	2 91	2 66	2 43				
Caslon Openface	**A**					3 59		2 97		2 45	2		1 61	
Caslon Recut	**A**			3 98		3 24		2 6		2 2	1 93		1.49	1.16
Caslon True-Cut	**Lu**					3 67		3 1		2 38	2 11		1.46	1.27
Caslon True-Cut Italic	**Lu**					3 76		3 22		2 56	2 32		1.95	1.39
Caslon with Italic	**I**			3 9		3 2		2 82	2 45	2 2	1 91		1.43	1 07
Caslon No. 3 with Italic	**I**			3 83		3 17		2 46		2 08	1 78		1 27	1.02
Century Bold	**A**			3 73		2 92		2 48		2.09	1.77		1.41	1.11
Century Bold	**APL**												1.52	1.09
Century Bold	**Li**			3 6	3.11	2.97	2 57	2 36	2 25	2.03	1 71		1.53	1.12
Century Bold	**Lu**									2.25	1.9		1.47	1.11
Century Bold No. 118	**M**		4.27	3 86	3.4	3.19	3 01	2 7	2.47	2 26	1.76		1.41	1.1
Century Bold Condensed	**A**			4 63		4 07		3 21		2 87	2 43		1.97	1.56
Century Bold Condensed	**Li**												1.94	1.53
Century Bold Extended	**Lu**									1.62	1 33		1 1	.86
Century Bold Italic	**A**			3.71		2 92		2.37		2 01	1.66		1.36	1.06
Century Bold Italic	**APL**												1.36	1.11
Century Bold Italic	**Lu**									2 17	1.82		1.43	1.08
Century Bold Italic No. 118	**M**			3.43		2 82		2.41		2.	1.7		1.32	
Century Bold with Italic	**I**			3.6	3.10	2.96		2.35		2.03	1.7		1.55	1.11
Century Catalogue	**A**			3 99		3 31		2.74		2.38	1.98		1.6	1.26
Century Catalogue Italic	**A**			3 77		3.19		2 66		2.36	1 99		1.6	
Century Expanded	**A**	4.28	3 72	3 7	3.43	2 96	2 73	2 45	2 37	2.14	1.78		1.41	1.09
Century Expanded	**Li**			3 6	3 19	2 87	2.66	2 41	2 3	2.11	1.76		1.5	1.13
Century Expanded	**Lu**									2 31	1.87		1.47	1.09
Century Expanded No. 20	**M**			3 83	3 35	3 07	2 76	2.56	2.44	2.23	1.79		1.41	1.09

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Century Expanded Italic	A	4 21	3 78	3 82	3 53	3 05	2.74	2 61	2 43	2 23	1 84		1.46	1.12
Century Expanded Italic No. 20	M			4 26	3 66	3 32	2 99	2 78	2 66	2.43	1.84		1.47	1.12
Century Expanded with Italic	I			3 6	3 2	2.87	2 68	2 41		2.11	1.78		1.5	1.13
Century Old Style	A			3.69		3.15	2.71	2 47	2.37	2.23	1.84		1 47	1.17
Century Old Style No. 157	M			3 83	3 35	3 15	2.82	2 56	2.44	2.23	1.86		1.47	1.17
Century Old Style Bold	A			3.17		2 72		2 12		1.9	1 58		i 26	1.
Century Old Style Bold Italic	A			3 20		2 74		2 12		1.89	1 59		1.27	1.01
Century Old Style Italic	A			4 02		3 44	3 01	2 66	2.53	2.38	1.95		1.56	1.21
Century Old Style Italic No. 157	M			4 26	3 66	3.44	3.07	2 78	2.66	2 43	1.95		1.56	1.21
Century Schoolbook	A			3 66		2.97		2 43		2.12	1.75	1.55	1.4	1.1
Century Schoolbook No. 420	M			3 66		2 89	2 66	2.48	2.27	2.13	1.79	1.58	1 25	
Century Schoolbook Bold	A			3 3		2.66		2.18		1.98	1.58	1.40	1.26	.99
Century Schoolbook Bold No. 620	M			3 22		2 51		2.17		1.86	1.55	1.42		
Century Schoolbook Italic	A			3 70		2 99		2.46		2.17	1 81	1 60	1.44	1.13
Century Schoolbook Italic No. 420	M			3 98		3 14	2 9	2 7	2.47	2 32	1 76	1 61	1 46	
Cheltenham	Li					3.56	3 2	2 99	2 72	2.53	2 15			1.42
Cheltenham Bold	A			3 6		3 07		2 43		2.18	1.8		1.46	1 15
Cheltenham Bold	APL					2 9		2.31		2.13	1.73		1.47	1.12
Cheltenham Bold	Li			3 39		2 85		2.28	2.28	2.08	1.72		1.49	1.15
Cheltenham Bold	Lu			3 6		3 05		2 42		2.21	1 93		1.46	1.12
Cheltenham Bold No. 86	M	4.		3 43	3.	2 82	2 68	2.35	2.19	2.	1.8		1.46	1.12
Cheltenham Bold Cond.	A			4 6		3 88		3 04		2.71	2.23		1.81	1.45
Cheltenham Bold Cond.	APL												1.77	1.4
Cheltenham Bold Cond.	Li			4 43		3 6		2.9		2.54	2.19		1.80	1.45
Cheltenham Bold Cond.	Lu			4 27		3 76		2 97		2 83	2.41		1.92	1.45
Cheltenham Bold Condensed No. 88	M	5.4		4 69		3.85		3.18		2 71	2 21		1.81	1.45
Cheltenham Bold Cond. Italic	A							3 00			2.24		1.81	1.36
Cheltenham Bold Cond. Italic	APL												1.79	1.41
Cheltenham Bold Cond. Italic	Lu									2 60	2.21		1.73	1.34
Cheltenham Bold Cond. Italic No. 88	M			4 69		3.85		3.18		2 71				
Cheltenham Bold Extended	A			2 66		2 31		1 79		1 61	1 34		1.07	.84
Cheltenham Bold Extended	Lu									1.76	1.45		1.11	.83
Cheltenham Bold Extended No. 287	M			2 79		2.32		1.91						

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Cheltenham Bold Extra Cond.	**A**			5.66		4.17		3.84		3.38	2 87		2 29	1.84
Cheltenham Bold Extra Cond.	**Li**												2 22	1.79
Cheltenham Bold Extra Cond.	**Lu**									3 13	2.55		2 13	1.6
Cheltenham Bold Extra Cond. No. 141	**M**			5 38		4 5		3 84		3.38				
Cheltenham Bold Italic	**A**			3 59		3 04		2 29		2 12	1 77		1.4	1.1
Cheltenham Bold Italic	**Lu**			3 18		2 84		2 26		2 18	1 84		1.44	1.07
Cheltenham Bold Italic No. 86	**M**	4.		3 43	2 98	2 82	2 66	2 35	2 17	2	1 76		1 4	1.1
Cheltenham Bold Outline	**Lu**												1.47	1.11
Cheltenham Bold Outline No. 12	**M**					2 79		2 32		1 99				
Cheltenham Condensed	**Li**					3 56		2 94		2 57	2 2		1.97	1.55
Cheltenham Italic	**A**			4 41		3 74		3 06		2 64	2 13		1.76	1.37
Cheltenham Medium	**A**			3 87		3 21		2 62		2 34	1.95		1.59	1.26
Cheltenham Medium No. 186	**M**	4 52		3 86	3 4	3 19	3 01	2 72	2 47	2.26	1 95		1.58	1.26
Cheltenham Med. Condensed	**Li**												1 96	1 5
Cheltenham Medium Italic	**A**			3 97		3 31		2 62		2 36	1 96		1 57	1.23
Cheltenham Medium Italic No. 186	**M**						3 00	2 7	2 45	2 26				
Cheltenham Old Style	**A**			4 57		3 85		3.19		2 72	2 25		1.81	1.42
Cheltenham Old Style	**Lu**									2.8	2.35		1.76	1.4
Cheltenham Old Style No. 64	**M**			4 43		3 67		2 97		2.55	2 24		1.79	1.4
Cheltenham Old Style Condensed	**Lu**									2.82	2.45		1.88	1.51
Cheltenham Old Style Cond. No. 264	**M**					4.11		3 32		2.79				
Cheltenham Old Style Cursive	**Lu**												1.75	1.30
Cheltenham Old Style Italic	**Lu**									2.55	2.2		1.76	1.32
Cheltenham Old Style Italic No. 64	**M**			4 82		4 03		3.22		2.77	2.13		1.72	1.35
Cheltenham Wide	**A**			3 88		3 23		2 63		2.35	1.95		1.56	1.22
Cheltenham Wide	**Li**			3 39		2 98		2 52		2.21	1.8			
Cheltenham Wide	**Lu**			3 71		3 23		2.56		2.44	2.		1.51	1.16
Cheltenham Wide No. 164	**M**			3 83	3.35	3.15		2.67		2.23	1.92		1.56	1.21
Cheltenham Wide Italic No. 164	**M**			4 26		3.44		2.91		2.43				
Cheltonian Bold Cond.	**I**					3 61		2 96		2.58	2.2		1.81	1.46
Cheltonian Bold Extra Cond.	**I**										2.73		2.21	1.78

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Cheltonian Bold with Italic	I			3.42		2.86		2 3		2.08	1.77		1.51	1.15
Cheltonian Condensed	I					3 61		2 96		2.59	2.2			
Cheltonian Medium Condensed	I												1.88	1.48
Cheltonian Medium with Italic	I					3.2		2.61	2.44	2.34	1.96		1.57	1.22
Cheltonian Wide	I			3.4		2.99		2.53		2.26	1.81		1.59	1.23
Cheltonian with Italic	I				3.89	3 55		2.98		2.53	2.16		1 81	1 46
Civilite	A							4.13		3.71	3.33		2.65	2.07
Clearface No. 89	M			3 86		3.18		2.7		2.26				
Clearface Bold	Lu												1.56	1.21
Clearface Bold Italic	Lu										1.83		1.46	1.15
Clearface Italic No. 89	M			3 86		3.18		2.7		2.26				
Cloister	APL												1.89	1.42
Cloister	Li			4 27		3 56		3.11	2 97	2.75	2 45		1 93	1 46
Cloister Black	A			4 26		3 71		2 83		2.49	2.13		1.67	1 35
Cloister Bold	A			3 92		3 26		2 79		2.52	2.22		1.75	1 35
Cloister Bold	APL												1.7	1.3
Cloister Bold	Li			3 8		3.13		2.71		2 48	2 18		1 73	1 34
Cloister Bold No. 295	M			3 92		3 23		2.75		2.43	2 21		1.75	1 35
Cloister Bold Italic	A			4.19		3.47		3 01		2.7	2 4		1.86	1.46
Cloister Bold Italic	APL												1.89	1.46
Cloister Bold Italic No. 295	M			4.27		3 52		2.98		2.65				
Cloister Bold with Italic	I			3 8		3 2		2 76		2.45	2 2		1 74	1 35
Cloister Italic	A			4 86		4 05		3 5		3 11	2 79		2.19	1 71
Cloister Italic	APL												2.15	1 72
Cloister Lightface	A			4 38		3 68		3 11						
Cloister Lightface Italic	A			4 75		3 93		3 42						
Cloister Old Style	A			4 35		3 66		3 11		2 79	2.50		1.95	1 51
Cloister Old Style with Italic	I			4 31		3 72		3 17		2 86	2 6		1 96	1.51
Cloister Old Style No. 395	M										2.49		1 94	1.5
Cloister Wide	Li			3 8		3 13		2 71		2 48	2.18			
Cochin Bold No. 616	M			3.		2 82		2 35		2.	1.59		1 26	.96
Cochin Bold Italic No. 616	M			3 43		2 82		2 35		2.	1.67		1.3	.98
Cochin Old Style No. 61	M			3 83	3 32	3 15	3 04	2 61		2.23	1.79		1.44	1 07
Cochin Old Style Italic No. 61	M			4.26	3 63	3 44	2 96	2 84		2.43	1.99		1.58	1.26
Cochin Open No. 262	M												1.27	1.07
Comstock	A										1.46		1.15	89
Cooper	A			3.93		3 54		2 78		2.47	1.91	1 64	1.55	1 16

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Cooper No. 482	M					3.54		2.78		2.47	1.91		1.53	1.16
Cooper Black	A			2 95		2.6		2.03		1.75	1.42		1.09	.83
Cooper Black No. 282	M			2.97		2.62		2.05		1.77	1.43		1.1	.83
Cooper Black Italic	A			3 37		2.78		2.2		1.89	1.58		1.2	.91
Cooper Italic	A			4.12		3.37		2.83		2.38	1.97	1.7	1.48	1 25
Cornell with italic	I					3.20		2.75		2.33				
Corona	Li	3.64	3.49	3 32	3 06	2 90	2 65	2 48	2.33	2.20	2.04			
Corona Italic	Li													
Coronet	Lu										3.72		2.85	2.04
Coronet Bold	Lu										3.22		2.46	1 86
Corvinus Bold	B					3 39		2 61		2.1	1.99	1.64	1.49	1.19
Corvinus Light	B					4 59		3 64		2.99	2.55	2.12	1.94	1 54
Corvinus Light Italic	B					4 72		3.69		3.01	2.76	2.33	2 1	1 7
Corvinus Medium	B					3 88		2 89		2.44	2.21	1.88	1.66	1.34
Corvinus Medium Italic	B					3.88		2.97		2.43	2.24	1.9	1.7	1 34
Corvinus Skyline	B							3.26		2.72	2.54	2.15	1.97	1.7
Cosmopolitan No. 4	M			3 82		3.14		2.65		2.44				
Cosmopolitan Italic No. 4	M			4.15		3.42		2.9		2.42				
Cushing Antique	Lu									2.41	1.96		1.49	1.14
Cushing No. 25	M	4 22		3 86	3.49	3 17	2 85	2 7	2 4	2.25				
Cushing Italic No. 25	M			3 86	3 49	3.17	3 00	2 7	2.45	2.25				
Czarin Capitals	BL									1.40			1.12	.81
Deepdene No. 315	M			4 39		3.62		3.08		2.56	2.31	2.04	1.79	1.36
Deepdene Bold No. 317	M			4 02		3 32		2 83		2 35	1 99		1.57	1.2
Deepdene Bold Italic No. 317	M			4 35		3 59		3.06		2.55	2 26		1.78	1.37
Deepdene Italic No. 315	M			5.25		4.34		3 69		3 07	2.82	2.54	2.21	1 69
Della Robbia	A			4 52		3.75		2.8		2 5	1.96		1.56	1.21
Della Robbia No. 231	M			4 44		3.32		2.79		2.23				
De Vinne	Li			3 68		3 13	2.93	2.61	2.3	2 1	1.81			
De Vinne No. 11	M	3.97		3.43		2 82		2.43	2.23	1.98				
De Vinne Cond. No. 111	M			4 14	3.6	3 38		2.68	2.45	2 25				
De Vinne Italic No. 11	M					2 82		2.43		1.98				
De Vinne Outline No. 42	M					2 82		2 43		1.98				
De Vinne with Italic	I			3 68		3.13	2.93	2.61	2.31	2.11				
Eden Bold	Lu							3.04		2.56	2.15		1.69	1.29
Eden Light	Lu					4 26		3.29		2 69	2.43		1.92	1.45
Egmont Bold with Italic	I					3.38		2.71		2.37	2.		1.51	1.21

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Egmont Medium with Italic	I					3.67		2.73		2.39	1.97		1.5	1.26
Egmont with Italic	I					3.65		2.98		2.6	2.27		1.73	1.31
Electra	LI				3.68	3.3	2.92	2.76	2.53	2.41	2.14			
Electra Bold	LI					3.30	2.92	2.76	2.53	2.41	2.14			
Electra Cursive	LI					3.29	2.92	2 71	2.51	2.41				
Elegante	BL							4.00		3.45	2.59		2.37	1.75
Elizabeth	B					4.07		3.36	3.04	2.74	2.34	2.13	1.9	1.58
Elizabeth Italic	B					4.07		3.57	3.16	3.04	2.74	2.34	2.28	1.82
Elzevir	I					2.99		2.58		2.23	1.82			
Elzevir	LI					2.97		2.55		2.23	1.81			
Elzevir No. 3	LI			3 98		3.09	2.85	2.66	2.44	2.23	1.93		1.53	1.15
Engravers Old English	A			3 85		3.29		2.82		2.41	2.07		1.63	1.26
Engravers Old English Bold No. 188	M			3.17		2.66		2.16		1.91				
Engravers Roman No. 223	M			2 66		1.99								
Engravers Text	I							3.45		2.94	2.5	2.12		
Erbar Bold Condensed	APL												2.14	1.7
Erbar Bold Condensed	LI					4.19		3.61		3.3	2.8		2.11	1.7
Erbar Light Condensed	APL												2.23	1.8
Erbar Light Condensed	LI					4.19		3.61		3.3	2.8		2.25	1.81
Erbar Medium Condensed	LI												2.21	1.79
Estienne	LI					3.45		3.01		2.72	2.39	2.18	2.03	
Eusebius Bold	Lu			4.26		3.56		2.81		2.51	2.18		1.72	1.32
Eusebius Bold Italic	Lu					3.88		3.22		2.88	2.68		1.82	1.46
Eusebius Light	Lu			4.50		4.07		3.20		2.73	2.43	2.15	1.85	1.36
Eusebius Light Italic	Lu					4.44		3.64		3.29	2.85	2.53	2.23	1.68
Eusebius Open	Lu												1.52	1.16
Excelsior	LI	3 6	3 41	3.2	2.9	2.72	2.57	2.41	2.97	2.17	2.			
Fairfield	LI			3.76		3.22	3.00	2.8	2.6	2.46	2.19			
Farmers Old Style No. 15	M			3.8	3.33	3.14	2.97	2.66	2.43	2.22				
Farmers Old Style Italic No. 15	M			4.22	3.64	3.42	3.23	2 9	2.66	2.43				
Franklin Gothic	A	3.93		3.15		2.66		2.1		1.89	1.63		1.26	.98
Franklin Gothic	APL												1.23	1.04
Franklin Gothic	LI												1.23	1.
Franklin Gothic	Lu			3.17		2.65		2.06		1.85	1.53		1.26	.97
Franklin Gothic Cond.	A			3.48		3.03		2.4		2.21	1.87		1.51	1.2
Franklin Gothic Extra Cond.	A			4.12		3.6		2.96		2.76	2.31		1.92	1.54
Franklin Gothic Extra Cond.	APL												1.9	1.57

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Franklin Gothic Extra Cond.	**Lu**									2 65	2.28		1.85	1.47
Franklin Gothic Italic	**A**	3 80		3 15		2 7		2 07		1.84	1.52		1.22	.96
Franklin Gothic Italic	**APL**												1 26	1.03
Freehand	**A**			3 98		3 38		2 97		2.64	2.37		1 86	1.42
Furlong Light	**Li**				84									
Futura Black	**B**													.97
Futura Bold	**B**					3 19		2 43		2 02	1 76	1 47	1 37	1 00
Futura Bold	**I**			3 64		3 11		2 43		1 98	1 75		1 41	1.04
Futura Bold Condensed	**B**					3 94		3 18		2 83	2 54	2.2	2 02	1 61
Futura Bold Condensed	**I**			4 82		3 72		3.11		2 77	2 48		1.9	1.61
Futura Bold Oblique	**B**					3 17		2 38		1 91	1.72	1.46	1 36	1 06
Futura Bold Oblique	**I**			3 64		3 11		2 43		1 98	1.75		1.37	1.04
Futura Book	**I**			4 38		3 88		3 03		2 59	2 21			
Futura Book Oblique	**I**			4 38		3 88		3.03		2 59	2.21			
Futura Demibold	**B**					3 54		2 63		2 31	2.04	1 69	1.53	1.24
Futura Demibold	**I**			4 02		3 49		2 59		2 3	2 01		1 52	1.23
Futura Demibold Oblique	**I**			4 02		3 49		2 59		2 3	2 01		1 52	1.23
Futura Display	**B**										2	1 72	1 53	1.23
Futura Light	**B**			4 64		3 79		3 08		2 63	2 29	1 92	1 78	1.38
Futura Light	**I**			4 44		3 76		3 09		2 59	2 26			
Futura Light Oblique	**B**					4 19		3 29		2 67	2 39	2 06	1 89	1 46
Futura Light Oblique	**I**			4 44		3 76		3 09		2 59	2 26			
Futura Medium	**B**			4 31		3 65		2 91		2 44	2 15	1.78	1.62	1.33
Futura Medium	**I**			4 22		3 6		2 87		2 42	2 11	1 76	1 61	
Futura Medium Condensed	**B**					4 75		3 56		3 00	2 71	2 38	2.11	1.84
Futura Medium Condensed	**I**					4 82		3 72		3 11 ‡1 2 77 3 11 ‡2 2 48			1.9	
Futura Medium Oblique	**B**					3 76		2 93		2 59	2.18	1.82	1.69	1.34
Futura Medium Oblique	**I**			4 22		3 6		2 87		2 43	2 11	1 76	1 61	
Garamond	**A**			3 6		3 3		2 90		2 55	2 29	1.97	1.77	1.37
Garamond No. 3	**APL**												1.75	1.31
Garamond	**Li**			4 29		3 51	3 13	2 85	2.53	2 3	2 06		1.76	1.21
Garamond No. 3	**Li**			3 94	3 6	3 32	3 08	2 87	2 73	2 57	2 28		1.73	
Garamond	**Lu**					3 82		3 14		2 66	2 41	2.07	1 89	1 44
Garamond American No. 648	**M**			4 00	3 61	3 29	3 01	2 85	2 72	2 54				
Garamond American Italic No. 648	**M**			4 62	4 08	3 72	3 4	3 22	3 07	2 85				
Garamond Bold	**A**			3 6		3 01		2 6		2.31	2 08	1.81	1 6	1 23

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Garamond Bold No. 3	**APL**												1.59	1.21
Garamond Bold	**Li**			3 83		3 17		2 53		2 02	1 83		1.51	1 08
Garamond Bold No. 3	**Li**			3 64	3 29	3 03	2 78	2 63	2 44	2 31	2 05		1 6	1.92
Garamond Bold	**Lu**					3.32		2 61		2 51	2 21		1.67	1.28
Garamond Bold Italic	**A**			3 91		3 32		2 86		2 51	2 26	1.97	1 77	1.37
Garamond Bold No. 3 Italic	**APL**												1 78	1.35
Garamond Bold Italic	**Lu**					3 76		2 97		2 8	2 49		1 88	1.45
Garamond Bold with Italic	**I**			3 75		3 19		2 75		2 42	2 17		1 61	1 21
Garamond Italic	**A**			4 32		3 71		3 26		2 88	2 59	2.25	2.	1 57
Garamond Italic	**Lu**					4 42		3 66		3 17	2 87	2 49	2 26	1 73
Garamond Open	**A**												1.73	1.33
Garamond with Italic	**I**			3 93		3 37	3 18	2 95	2 7	2 59	2 3		1 77	1 38
Garamont No. 248	**M**			4 69		3 44	3 00	2 72	2 44	2 24	2 01		1.58	.97
Garamont Bold No. 548	**M**			3 68	3 29	3 01	2 75	2 61	2 47	2 31	2 08		1.6	1.23
Garamont Bold Italic No. 548	**M**			4 02	3 61	3 28	2 99	2 86	2 7	2 52	2 25	1 97	1 76	1 37
Garamont Italic No. 248	**M**			5 4		3 98	3 5	3 14	2 83	2 59	2 34		1.82	1 39
Gillies Gothic Bold	**B**												2.03	1 53
Allow for swashes														
Gillies Gothic Light	**B**												2.36	1 81
Allow for swashes														
Gothic No. 544	**A**			3 11		2 87		2 44		1 92	1 65		1.36	1 13
Gothic No. 545	**A**			2 98		2 77		1.98		1.81	1 51		1.3	1.06
Gothic No. 578	**A**			3 4		2 81		2 07		1.8	1 52		1.16	.91
Gothic No. 13	**APL**					3 35		2 95		2 42	2 1		1.89	1 52
Gothic No. 13	**I**			4 07		3 36		2 93		2 46	2 12		1 91	1 53
Gothic No. 16	**I**					2 6		2 14		1 97	1 63		1 46	1.13
Gothic No. 13	**Li**					3 35		2 92		2 46	2 12		1 81	1.46
Gothic No. 16	**Li**					2 57		2 12		1 97	1 63		1 48	1.14
Gothic No. 18	**Li**									2 69	2 17		1 96	1.58
Gothic No. 18	**Li**			4 12	3 88	3 72	3 40	3 20	3 03	2 87	2 46		1.96	1.58
Gothic No. 38	**Li**							2 25		1 96	1 54		1.31	1.06
Gothic Alternate No. 2 No. 77	**M**			5 4		4 15		3 38		2 85				
Gothic Condensed No. 523	**A**			3 97		3 57		2 97		2 36	2 17		1.95	1.51
Gothic Condensed No. 524	**A**			4 88		4 42		3 37		2 87	2 31		1 7	1.54
Gothic Condensed No. 529	**A**			4 94		4 59		3 9		3 58	2 91		2.49	2.03
Gothic Condensed No. 2	**APL**			4 7		4 4		3 88		3.51	2 9			
Gothic Condensed No. 2	**I**			4 7		4 4		3 95		3 59	3		2.47	2.02
Gothic Condensed No. 1	**Li**					3 45		2.80	2 53	2 30	2 06		2.02	

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Gothic Condensed No. 2	**Li**			4 68		4 44		3 93		3 57	2 90		2 44	2 02
Gothic Condensed	**Lu**			4 68		4.07		4 12		3 57	3 03		2 31	1.83
Gothic Condensed No. 49	**M**	4 92		4.5		3 38		2 7		2 25				
Gothic Franklin No. 107	**M**	3 98		3 16	2 9	2 67		2.12		1 88	1 57		1.27	
Gothic Globe No. 240	**M**			3 82		3 15		2 69		2 24				
Gothic Globe Condensed No. 239	**M**			4 86		4 12		3 35		2.82				
Gothic Globe Extra Cond. No. 230	**M**			5 96		4 86		4 11		3 56				
Gothic Inclined No. 254	**M**			2 98	2 65	2 39		1 91						
Gothic Inclined Bold No. 132	**M**			3 18		2 65		2 17		1 91				
Gothic Lightline	**A**					3 42		2 75		2 4	2 04		1.64	1.29
Gothic Lining No. 176	**M**			3 85		3 5		3 17		2 7				
Gothic Lining No. 545 No. 66	**M**	3 98		3 41		2 8		2 27		1 91				
Gothic Lining Light No. 106	**M**			3 73		3 17		2 58		2 25				
Gothic Medium Cond.	**Lu**			4 07		3 6		3 17		2 77	2 26		1 78	1.34
Gothic Modernized Alternate No. 51	**M**			5.4		4 5		3 86		3 38				
Gothic News	**A**			3 42		3 05		2 53		2 27	1.87		1.5	1.2
Gothic News Condensed	**A**			4 2		3 76		3 13		2 87	2.44		1.95	1.58
Gothic News Extra Cond.	**A**			6 01		5 56		4 8		4 37	3 73		2.99	2 42
Gothic Open Condensed Capitals	**BL**													
Gothic Philadelphia Lining No. 52	**M**			3 41		2 84		2 39		1 99				
Gothic Record	**Lu**			3.72		3 08		2.59		2 18				
Gothic Square	**Lu**			3 26		2 84		2 34		2 08	1 66		1.3	.97
Gothic Square Heavy	**Lu**			3 16		2 65		2 06		1.86	1 53		1.27	.98
Gothic Tourist No. 140	**M**			5.4		4.15		3.38		2.92				
Gothic Wide	**I**			2 89		2 31		1.92		1.63	1 43			
Goudy Bold	**A**			3 69		3.		2.46		2.15	1.78		1.42	1.13
Goudy Bold No. 294	**M**			3.66		3.01		2.48		2.15	1.79		1.42	1.13
Goudy Bold Italic	**A**			3 81		3.1		2.55		2.23	1 86		1.49	1.18
Goudy Bold Italic No. 294	**M**			3.71		3.05		2.52		2.19	1.86		1.48	1.17
Goudy Bold with Italic	**I**			3.69		3.03		2.48		2.16	1.78		1.47	1.13
Goudy Catalogue	**A**			3 85		3.13		2.58		2.24	1 86		1.49	1.18
Goudy Catalogue Italic	**A**			4.1		3.31		2.75		2.37	2.		1.6	1.26

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Goudy Cursive	**A**			4.44		3.61		3.		2.62	2.19		1.74	1.38
Allow for swashes														
Goudy Cursive No. 324	**M**										2.18		1.74	1.37
Allow for swashes														
Goudy Extra Bold	**A**			3.42		2.78		2.29		2.	1.66		1.33	1.04
Goudy Handtooled	**A**							2.46		2.15	1.79		1.42	1.13
Goudy Handtooled No. 383	**M**							2.48		2.16	1.79		1.43	1.13
Goudy Handtooled Italic No. 383	**M**							2.57		2.24	1.87		1.49	1.18
Goudy Heavyface No. 380	**M**										1.53		1.21	.91
Goudy Heavyface Cond. No. 382	**M**									2.21	1.89		1.44	1.1
Goudy Heavyface Italic No. 380	**M**										1.49		1.18	.89
Goudy Italic	**A**			4.46		3.61		3.01		2.62	2.18		1.74	1.38
Goudy Lanston No. 279	**M**										2.07		1.57	1.2
Goudy Light No. 38	**M**			3.81	3.33	3.13	2.99	2.65	2.42	2.22				
Goudy Light Italic No. 38	**M**			4.15	3.63	3.42	3.23	2.9	2.64	2.42				
Goudy Modern No. 293	**M**									2.44	2.1		1.59	1.2
Goudy Modern Italic No. 293	**M**									2.53	2.17		1.73	1.28
Goudy Old Style	**A**			3.98		3.21		2.68		2.35	1.96		1.56	1.24
Goudy Old Style No. 394	**M**			3.99		3.25		2.68		2.34	1.95		1.56	1.24
Goudy Old Style Italic No. 394	**M**			4.43		3.62		2.98		2.59	2.18		1.74	1.37
Goudy Old Style with Italic	**I**			4.01		3.36		2.74		2.42	2.01			
Goudy Open No. 291	**M**										1.86		1.56	1.2
Goudy Open Italic No. 291	**M**										2.17		1.6	1.23
Goudytype	**A**			3 68		3.03		2.47		2.15	1 74		1.44	1.13
Goudy Village No. 410	**M**										2.1		1.64	
Goudy Village Italic No. 410	**M**										2.46		1.92	
Granjon	**APL**												1.73	1.3
Granjon	**Li**			4 29		3.48	3.14	2 94	2.72	2 5	2 23		1.9	1.31
Granjon No. 400	**M**					3.58	3.26	2 99	2.75					
Granjon Bold	**Li**			4.22		3.5	3.16	2.97	2.73	2.51	2.25			
Granjon Italic	**APL**												1.88	1.53
Granjon Italic No. 400	**M**					3.91	3.55	3.26	3.02					
Gravure	**A**									2.06	1.85		1.47	1.17
Grayda	**A**												2.54	2.00

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Greeting Monotone	A							3.03		2.76	2.46		1.92	1.53
Greeting Monotone	I							3.11		2.57	2.26		1.72	
Hadriano No. 309	M										1.77		1.61	1.07
													#2 1.34	
Hauser Script	Lu													1.64
Hess Bold No. 159	M			3 4		2.79		2.27		1.98				
Hess Bold Italic No. 159	M			3.4		2.79		2 27		1.98				
Hess Old Style No. 242	M			3 83		3.15	2.99	2 67	2.42	2.23	1.79		1.42	1.07
Hess Old Style Italic No. 242	M			4.26		3.44	3.23	2 91	2.64	2 43	1.96		1.58	1.19
Hess Title No. 161	M			3 4	2.98	2.79		2.38		1.98				
Hess Title Italic No. 161	M			3.4		2.79		2.38		1.98				
Hobo	A			3 65		2.75		2 26		1 88	1.62		1.34	.99
Hollywood	A			3 57		3.18		2 68		2.4	2.03		1.68	1.32
Homewood Capitals	BL												.74	.65
Ideal News with Italic	I		3.65	3 26	2 92	2.85	2.65	2 41	2 17	1 98	1.73			
Invitation	A			3 14		2 66		2.33		2.07	1.87		1.46	1.13
Invitation Shaded	A					2.55		2 25		2.	1.8		1.39	1.1
Ionic No. 5	Li	4.08	3 63	3 29	2.99	2.7	2.46	2.34		2.1				
Ionic No. 56	M	3 66	3 4	3 29	3.08	2.79								
Italian Old Style No. 243	M					3 19		2.73		2 38	2.11		1 66	1.27
Italian Old Style Italic No. 243	M					3 32		2 84		2.49	2.19		1.74	1.32
Janson	Li					3 09	2 81	2 61	2 46	2 31	2.08			
Janson No. 401	M					3 29	3 1	2 79	2 55	2 33	2 09		1.65	
Janson Italic No. 401	M					3 46	3 27	2 94	2 68	2.45	2.09		1.65	
Jenson Condensed	Li												1.78	
Jensen Old Style No. 58	M			3.86		3 17		2.7		2 25				
John Hancock No. 142	M		3 29	3 07		2 58		2 17		1.97				
Karnak Black	Lu							1 99		1.8	1.5		1.15	.94
Karnak Black Condensed	Lu										2.27		1.76	1.35
Karnak Black Condensed Italic	Lu										2.11		1.64	1.27
Karnak Black Italic	Lu										1.43		1.05	.87
Karnak Intermediate	Lu			3.89		3 04		2 37		2 08	1.73		1.33	.98
Karnak Light	Lu			4.02		3.23		2 51		2 12	1.8		1.41	1.04
Karnak Medium	Lu			3.72		3.09		2.39		2.	1.67		1.29	.98
Karnak Obelisk	Lu										3.36		2.64	1.99
Kaufman Bold	A							2.85		2 58	2.32		1.77	1.37

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Kaufman Script	**A**							3.12		2 84	2.54		1.94	1.5
Allow for swashes														
Kennerly Bold No. 269	**M**			3.43		2.74		2 39		2.	1.77		1.61	1.07
													#2 133	
Kennerly Bold Italic No. 269	**M**			3 57		2.85		2 5		2.08	1 85		1.67	1.11
													#2 1 4	
Kennerley Old Style No. 268	**M**			4.51		3 62	3 18	2 93	2 62	2 41	2 1		1 92	1 23
Kennerly Old Style Italic No. 268	**M**			4.72		3 82	3 34	3.1	2.79	2 59	2.24		2.03	1.34
Kenntonian with Italic	**I**			4.2		3 28		2 87		2.46	2.14		1.91	1.23
Keynote	**A**													1.86
Allow for swashes														
Korinna with Bold	**I**			3 8		2.96	2 74	2 46		2.08	1.78		1.46	
Lafayette Extra Cond.	**Lu**												2.99	2.25
Laureate	**Lu**												1.46	1 07
Legend	**B**												2.38	1.73
Liberty Allow for swashes	**A**									3.7	3.08		2.54	2 07
Lino Text	**Li**					3.64		3.03		2 63	2.43	2.16		
Litho Light	**A**					2.61		1.97		1.77	1.5		1.21	.92
Litho Roman	**A**			3.13		2.65		2.01		1.77	1.47		1.19	.92
Lorimer with Italic	**I**			3.59		2.97	2.69	2.58		2.19				
Lucian	**B**							2.93		2.58	2 32	2.09	1.92	1.42
Lucian Italic	**B**							3.		2.56	2.25	2.05	1 88	1.4
Ludlow Black	**Lu**					2 33		1.73		1.64	1.36		1.1	.85
Ludlow Black Italic	**Lu**									1.58	1 29		1.05	.81
Lydian	**A**							2.72		2.28	2.		1.6	1.2
Lydian Bold	**A**							2.7		2.26	2 02		1 59	1.2
Lydian Bold	**I**							2.7		2.26	2.02		1.59	1.2
Lydian Bold Italic	**A**							2.83		2.32	2 08		1.65	1.26
Lydian Bold Italic	**I**							2.83		2 32	2.08		1.65	1.26
Lydian Cursive	**A**												1.91	1.47
Lydian Italic	**A**							2.97		2.51	2.22		1.77	1.35
Mandate	**Lu**												1.77	1.3
Allow for swashes														
Mayfair Cursive	**Lu**										2.68		2.17	1.57
Allow for swashes														
Medieval Bold	**I**			3.99		3 18	2.83	2 54		2.14	1.89		1.54	1.16
Medieval with Italic	**I**			4.08		3.14	2.83	2.59		2.19	1.91		1.56	1.18

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Memphis Bold	**APL**			3.51		3 29		2.53		2.07	1.76		1.49	1.03
Memphis Bold	**Li**			3.51		3.28	2.85	2.57		2.07	1.76		1.52	1.08
Memphis Bold Condensed	**Li**							3.00		2.53	2.2		1.88	1 44
Memphis Extra Bold	**APL**												1 29	.93
Memphis Extra Bold	**Li**					2.43		2.07		1.7	1.49		1.3	.93
Memphis Extra Bold Condensed	**Li**					3.56		3.00		2 53	2.2		1.88	1.44
Memphis Light	**APL**			3 51		3.25		2 54		2.07	1.76		1.51	1.08
Memphis Light	**Li**			3.53		3.29	2 85	2.55		2.06	1.75		1.51	1 11
Memphis Medium	**APL**												1.49	1.07
Memphis Medium	**Li**			3 51		3 28	2 83	2 54		2 07	1.74		1.49	1.07
Memphis Medium Condensed	**APL**												1.91	1.46
Memphis Medium Condensed	**Li**					3 56		3 00		2.53	2.2		1.9	1.45
Memphis Medium Italic	**APL**												1.52	1 07
Metroblack No. 2	**APL**			3 56		3.13		2.5		2.1	1.79		1.41	1.08
Metroblack No. 2	**Li**			3 61		3.19		2 53		2.1	1 8		1.42	1.09
Metrolite No. 2	**APL**			3 6		3.1		2 5		2.1	1.79		1.41	1.08
Metrolite No. 2	**Li**			3 61		3.19		2 53		2.1	1.8		1.42	1.09
Metromedium No. 2	**APL**			3 91		3.51		2.8		2 37	2.03		1 59	1.23
Metromedium	**Li**			3 98		3.55		2.85		2.37	2.06		1.59	1 27
Metrothin No. 2	**APL**			3 99		3.51		2 8		2.37	2.02		1.59	1.26
Modern No. 8	**M**	4 12		3.83	3 33	3.11	2.96	2.67	2 43	2 22	1.91		1.48	
Modern No. 34	**M**			4.12		3 33	3.11	2 8	2 66	2 43				
Modern Condensed No. 1	**M**			4 42		3 82		2.96						
Modern Condensed Italic No. 1	**M**			4 84		4 16		3 21						
Modern Italic No. 8	**M**	4 48		4 15	3 64	3 42	3 23	2 9	2 65	2 43	2.06		1.61	
Modern Italic No. 34	**M**			4.48		3 64	3.42	3.06	2 9	2 65				
Modern Medium Cond. No. 14	**M**					3.33				2.43				
Modern Medium Cond. Italic No. 14	**M**					3 65				2 65				
Narciss	**APL**												1.6	1.09
Narciss	**Li**							2 43		2 02	1.87		1.62	1.13
Neon Capitals	**N**												.92	.76
New Bookman No. 398	**M**										1 68		1.3	.98
Newport	**A**			5 01		4 35		3 64		3 08	2 66		2.23	1.68
Nicholas Cochin	**A**			3 83		3 36		2 9		2 65	2 31		1.98	1.37
Nicholas Cochin No. 461	**M**										2.31		1.98	1.39
Nicholas Cochin Italic	**A**			4 06		3 46		3 02		2 84	2 37		2 1	1.52
Nubian	**A**			2.16		1.72		1 4		1 2	99		.78	.62

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
No. 1	**Li**		3 83	3 39	3 2	2.97	2 7	2 54	2 37	2 11				
No. 2	**Li**			3 17	2 95	2 9		2.41		2 01				
No. 11-B	**Lu**			3 47		2 82		2 42		2 15	1 74		1.41	1.12
No. 11-B1	**Lu**			3 89		2.96		2.51		2 19	1 81		1 49	1 17
No. 11-L	**Lu**			3 83		3 09		2 57		2 3	1 93		1 54	1.22
No. 11-L1	**Lu**			4 27		3.39		2 88		2 55	2.13		1.73	1.37
No. 16	**I**			3 26	2.93	2 69	2.46	2 31		1.96				
No. 16	**Li**			3 26	2 93	2 66	2 46	2 3		1.95	1 67			
No. 21	**Li**			3 8	3 22	3 1	2.96	2 62	2.41	2 2				
Old English	**Lu**					3 03		2 66		2 33	2 01		1.62	1.23
Old Style No. 1	**I**			3 67	3 29	3 05	2.83	2 63	2 51	2.23			1.77	
Old Style No. 1	**Li**	4 11		3 75	3 39	3 13	2 9	2 7	2.53	2.28	1.92		1.75	
Old Style No. 3	**Li**			3 8		3 36		2.86		2.4				
Old Style No. 7	**I**					3 32	3 04	2 82						
Old Style No. 7	**Li**			4 01	3 6	3 29	3 06	2 8	2.53	2 35	2.		1.55	1.13
Old Style No. 9	**I**					3 19	2.9	2 61						
Opticon	**Li**		3 35	3 14	2 88	2 63	2.55	2 375	2.23	2.14				
Original Old Caslon No. 337	**M**				3 68	3.34	2 98	2 67	2 44	2 23	2 14		1.75	1.3
Original Old Caslon Italic No. 337	**M**				4 02	3 65	3 23	2 91	2.66	2.43	2 33		1.88	1.48
Original Old Style	**Li**			3 83		3.1		2.75		2.37	1.99			
Othello	**A**												1.55	1.28
Pabst Extra Bold	**APL**												1.13	.85
Pabst Extra Bold	**Li**							2 01		1 68	1.46		1.16	.87
Pabst Extra Bold Condensed	**APL**												1.53	1.16
Pabst Extra Bold Condensed	**Li**							2.37		1.99	1.69		1.56	1.2
Pabst Extra Bold Italic	**APL**												1.1	.85
Pabst Old Style	**Li**							2 67		2 26	1.89		1.59	
Pabst Old Style No. 45	**M**			3.84		3.18		2.7		2.25				
Palisade	**I**												2.28	1.72
Paragon	**Li**		3.39	3 19	2 87	2 66	2 52	2 34						
Paramount	**A**			4.37		3.76		2 96		2 61	2 22		1.78	1.41
Parisian	**A**							3.3		3 02	2.53		2.03	1.64
Parisian	**I**									3.05	2.59		2.05	
Park Avenue	**A**									2.83	2.54		2.07	1.64
Allow for swashes														
Park Avenue	**I**									2.94	2.54		2.03	
Parsons	**A**			3.75		3.21		2.82		2.39	1.96		1.54	1.18

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Phenix	**A**													2.41
Piranesi	**A**					3.89		3.09		2.85	2.43		1.94	1.48
Piranesi Bold	**A**			4.03		3.5		2.74		2.47	2.06		1.67	1.26
Piranesi Bold Italic	**A**			4.48		3.84		3.08		2.79	2.39		1.89	1.48
Allow for swashes														
Piranesi Italic	**A**					4.62		3.68		3.38	2.85		2.33	1.78
Allow for swashes														
Poster Bodoni	**APL**												1.12	.82
Poster Bodoni Compressed	**APL**												2.25	1.73
Poster Bodoni Compressed	**Li**												2.27	1.75
Poster Bodoni Italic	**APL**												1.17	.87
Post Text No. 5	**M**		3 66	3 46	3 14	2 96	2.73	2 54	2 32	2.12				
Post Text Italic No. 5	**M**		4.0	3.8	3.42	3.23	3.01	2.77	2.53	2.32				
Powell	**Lu**										1.65		1.45	1.02
Radiant Bold	**Lu**							2.46		2.10	1.81		1.43	1.09
Radiant Bold Condensed	**Lu**									2.85	2.51		1.98	1.60
Radiant Bold Extra Condensed	**Lu**										3.32		2.7	2.07
Radiant Heavy	**Lu**							2.28		1.99	1.73		1.33	1.02
Radiant Medium	**Lu**			4.56		3.57		2.83		2.42	2.07		1.62	1.24
Raleigh Cursive	**A**							4.04		3.28	3.04		2.36	1.78
Allow for swashes														
Regal No. 1 with Italic	**I**	4.07		3.26	2.97	2.85	2.64	2.43		1.99	1.7			
Regal No. 2 with Italic	**I**		3.65	3.11	2.9	2.73								
Rex with Italic	**I**	3.88		3.45	3.32	3.		2.53		2.13	1.85			
Rivoli	**A**							3.48		3.1	2.6		2.12	1.68
Rivoli	**I**									3.05	2.59		2.05	
Rivoli Italic	**A**							3.28		2.95	2.51		2.03	1.65
Romany	**A**									2.36	2.17		1.73	1.36
Allow for swashes														
Ronaldson Old Style No. 16	**M**			3.82	3.34	3.13	2.96	2.66	2.42	2.22				
Ronaldson Old Style Italic No. 16	**M**			4.15	3.63	3.42	3 21	2.9	2.64	2.42				
Rugged Black	**I**							2.1	1.74		1.53		1.38	1.07
Ryerson Condensed	**Li**												1.89	1.60
Samson	**Lu**													.97
Sans Serif Bold No. 330	**M**			4.23		3.37		2.86		2.49	2.17		1.97	1.49
Sans Serif Bold Italic No. 330	**M**			4.26		3.3		2.81		2.44	2.16		1.94	1.49

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Sans Serif Extrabold No. 332	M			3.55		2.94		2.39		2.08	1.77		1.6	1.23
San Serif Extrabold Cond. No. 333	M										2.16		1.94	1.45
Sans Serif Extra Bold Italic No. 332	M					3 01		2.56		2.22	1 81		1 67	1.25
Sans Serif Light No. 329	M			4.27		3 39		2 89		2.51	2.55		1.98	1.56
Sans Serif Light Condensed No. 357	M										2.89		2 64	2.05
Sans Serif Light Italic No. 329	M			4.31		3 42		2 89		2 52	2 37		2.1	1.66
Sans Serif Medium No. 331	M			4 23		3.35		2.85		2 48	2 29		2 12	1 59
Sans Serif Medium Cond. No. 354	M										2.54		2 36	1.73
Schoolbook Oldstyle	A			3 62		2.97		2 41		2 1	1.75		1 4	1 1
Scotch	Li			3 51		3.1		2.73	2 53	2.19	1.83		1.46	1.12
Scotch No. 2	Li					3 31	2 96	2 61	2.44	2.21				
Scotch Roman	A			3 61		3.18		2.85	2 7	2 26	1.87		1.45	1.12
Scotch Roman No. 36	M			4.12		3 34	2 98	2 67	2.44	2 23	1.89		1.46	1.12
Scotch Roman Italic No. 36	M			4.47		3.65	3 23	2 91	2 66	2 43				
Scotch with Italic	I					3.12		2 75	2 6	2.21	1 86			
Shaw Text	A							3.25		2.82	2 49		1.76	1 35
Spartan Black	A			3 32		3.08		2 39		1.99	1.75		1.36	1 07
Spartan Black	Li			3.35		3.08		2.39		1.98	1.74		1.4	1 08
Spartan Black Condensed	A							2.90		2.65	2.43		1.97	1 55
Spartan Black Condensed	Li							2.9		2.61	2 43		1.92	1.54
Spartan Black Condensed Italic	A							2.90		2 65	2.44		2.07	1.59
Spartan Black Italic	A			3.35		3.08		2 39		1.99	1 75		1.36	1.08
Spartan Book	Li			3.84		3.49	3.00	2 65	2.44	2.30	2.06			
Spartan Heavy	A			3 89		3 35		2.61		2 05	2 02		1.61	1.25
Spartan Heavy	Li			3.8		3.5		2.6		2 27	2 02		1.54	1.24
Spartan Heavy Italic	A			3 84		3.52		2 61		2 05	2 02		1.61	1.24
Spartan Light	Li			3.84		3.68		2.92		2.48	2.17			
Spartan Medium	A			3.84		3 66		2.92		2.50	2.16		1.68	1.39
Spartan Medium	Li			3.8		3.68		2.92		2.48	2.17		1.55	1 25
Spartan Medium Condensed	Li										2.44		1.93	1.57
Spartan Medium Italic	A			3.89		3.66		2.92		2.51	2.17		1.65	1.42

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Stellar	Lu					4.22		3 41		3 37	2.93		2.17	1.65
Stellar Bold	Lu					3 91		3.31		2.99	2.55		1.91	1.42
Stygian Black	Lu										1 61		1.19	1.06
Stygian Black Italic	Lu										1 66		1.22	1.12
Stymie Black	A									1 74	1 45		1.16	.93
Stymie Black Italic	A									1 66	1 4		1.12	.89
Stymie Bold	A			3 36		2 92		2 29		2 02	1.67		1.31	1.03
Stymie Bold No. 790	M			3 56		2 94		2 38		1 99				
Stymie Bold No. 189	M			3 43		2.82		2 29		1 92	1 57		1.23	.97
Stymie Bold Condensed	A									2 68	2 28		1.85	1.47
Stymie Bold Italic	A			3 28		2 86		2 22		1 98	1.63		1.29	1.01
Stymie Bold Italic No. 189	M			3 3		2 72		2.2		1.85	1 65		1.3	1.02
Stymie Extrabold No. 390	M			3 31		2 73		2 21		1.86	1 5		1.17	.91
Stymie Extrabold Cond. No. 490	M										2.18		1.73	1.36
Stymie Extrabold Italic No. 390	M			3 16		2 6		2 11		1.77	1 47		1.14	.89
Stymie Light	A			3.79		3 21		2 41		2 18	1.81		1.43	1.15
Stymie Light No. 190	M			3.92		3.23		2.61		2 2	1 82		1.44	1.15
Stymie Light Condensed No. 690	M										3 27		2.61	2.07
Stymie Light Italic	A			3 62		3 02		2 35		2.07	1.73		1.38	1.1
Stymie Light Italic No. 190	M			3 56		2.94		2.38		1.99	1.75		1.39	1.11
Stymie Medium	A			3 59		3.		2 28		2.05	1.71		1.38	1.08
Stymie Medium No. 290	M			3.92		3.23		2.61		2.2	1.73		1.39	1.09
Stymie Medium Condensed No. 590	M										2.7		2.16	1.7
Stymie Medium Italic	A			3.58		2.92		2.23		2.03	1.66		1.32	1.06
Stymie Medium Italic No. 290	M										1.7		1.34	1.07
Tempo Black	Lu												1.21	.89
Tempo Bold	Lu			4.02		3 34		2.61		2 31	1.95		1.47	1.07
Tempo Bold Condensed	Lu			5.34		4.12		3.38		2.94	2.52		1.95	1.45
Tempo Bold Italic	Lu									2.44	2.07		1.61	1.18
Tempo Heavy	Lu			3.6		2.81		2.43		2.01	1.79		1.31	.99
Tempo Heavy Condensed	Lu							3.11		2.80	2.39		1.98	1.48
Tempo Heavy Cond. Italic	Lu										2.34		1.93	1.45

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Tempo Heavy Italic	**Lu**									2.07	1.76		1.36	1.02
Tempo Light	**Lu**			4.73		3.79		3.29		2.75	2.33		1.76	1.29
Tempo Light Italic	**Lu**							3.1		2.66	2.25		1.73	1.28
Tempo Medium	**Lu**			4.47		3.56		3.04		2.75	2.24		1.72	1.29
Tempo Medium Italic	**Lu**					3.93		3.02		2.6	2.24		1.75	1.23
Textype	**Li**			3.35	3.1	2.98	2.73	2.52	2.32	2.23	2.05		1.58	
Textype Bold	**Li**			3.32	3.09	2.92	2.68	2.48	2.3					
Times Roman Bold	**Li**		4.07	3 8	3.40	3.14	2.90	2.73	2.53	2.31	2.07			
Times Roman Italic	**Li**			3.8	3.40	3.14	2.90	2.73	2.53	2.31	2.07			
Title Litho Shaded Capitals	**BL**									1.21	.82		.62	
Tourist Ex Condensed	**BL**													2.37
Tower	**A**									3.15	2.67		2.11	1.69
Trafton Script	**B**										3.27	2.8	2.47	1.96
Allow for swashes														
Twentieth Century Bold No. 604	**M**			4.0		3.48		2.61		2.26	2.01		1.53	
Twentieth Century Bold Italic No. 604	**M**			4 5		3.94		2.94		2.55				
Twentieth Century Extra Bold No. 603	**M**			3.69		3.19		2.4		2.01	1.74		1.35	
Twentieth Century Extra Bold Italic No. 603	**M**			3.82		3.3		2.48		2.07				
Twentieth Century Light No. 606	**M**			4.68		3.81		3.08		2.61	2.26		1.7	
Twentieth Century Light Ital. No. 606	**M**			4.92		4.0		3.2		2.73				
Twentieth Century Medium No. 605	**M**			4.68		3.66		2.94		2.44	2.09		1.63	
Twentieth Century Medium Ital. No. 605	**M**			4.87		3.81		3.05		2.54				
Typo Roman	**A**							3.6		3.21	2.92			
Typo Roman Light	**I**							3.45		2.94	2.5	2.12		
Typo Roman Shaded	**A**									3.24	2.94			
Typo Shaded	**A**										3.17		2.48	
Typo Text	**A**					3.74		2.86		2.51	2.14		1.72	1.32
Typo Upright	**A**									3.62	3.34		2.56	
Ultra Bodoni	**A**			2.57		2.18		1.97		1.56	1.46		1.12	.82
Ultra Bodoni No. 675	**M**					2.2		1.99		1.58	1.45		1.13	.83

Name of face	Mnf.	5	5½	6	7	8	9	10	11	12	14	16	18	24
Ultra Bodoni Condensed	**A**												1.3	.95
Ultra Bodoni Extra Condensed	**A**									2.15	1.95		1.66	1.23
Ultra Bodoni Italic	**A**			2.55		2.18		1.98		1.57	1.43		1.13	.84
Ultra Modern (McMurtrie)	**Lu**									2.12	1.93		1.45	1.17
Ultra Modern Bold	**Lu**										1.81		1.33	.99
Ultra Modern Italic (McMurtrie)	**Lu**									2.3	2.14		1.59	1.19
Underwood Bold	**Lu**							2.17		1.81				
Vogue	**I**			3.8		3.51		2.93		2.44	2.12		1.67	1.28
Vogue Bold	**I**			3.98		3.56		2.88		2.38	2.08		1.61	1.23
Vogue Bold Condensed	**I**					4.33		3.67		3.02	2.48		2.25	1.75
Vogue Bold Oblique	**I**			3 97		3.52		2 84		2.37	2.06		1.6	1.26
Vogue Extra Bold	**I**			3 71		3.08		2.5		2.03	1.79		1.48	1.12
Vogue Extra Bold Condensed	**I**					4.33		3.64		3.00	2.63		2.11	1.58
Vogue Extra Bold Oblique	**I**			3 71		3 05		2.48		2.03	1.79		1.47	1.11
Vogue Medium Condensed	**I**												2.08	1.62
Vogue Oblique	**I**			4 01		3.63		2.88		2 38	2 08		1.67	1.28
Waldorf Text	**A**										2.86		2.49	
Waverly with Italic	**I**					3.11	2.73	2.56	2.34	2.13	1.80			
Wedding Text	**A**			4.59		3.71		3 01		2.7	2 47			
Weiss Italic	**B**					4.54		3.51	3.38	2.92	2.66	2.3	2.09	1.69
Allow for swashes														
Weiss Roman	**B**					3.76		3.16	2 93	2.58	2.27	1.92	1.7	1.37
Weiss Roman	**I**					3.88	3.45	3.25	2.97	2.63	2.32	1.92	1.53	
Weiss Roman Bold	**B**					3.67		3.02	2.78	2.44	2.06	1.8	1.59	2.2

APPENDIX I

Printed Samples of Paper

by leading paper manufacturers

- THE CHAMPION PAPER AND FIBRE COMPANY
- HAMMERMILL PAPER COMPANY
- RIEGEL PAPER CORPORATION
- S. D. WARREN COMPANY
- WEST VIRGINIA PULP AND PAPER COMPANY

WARREN'S
OFFSET ENAMEL

S. D. WARREN CO. 

BOSTON 1, MASS.

A

WARREN'S OFFSET ENAMEL

This double coated paper is the standard for high quality reproduction by offset lithography.

Warren's OFFSET ENAMEL is available in this glossy finish and in a dull finish and in an embossed Saxony finish. It is manufactured in the basis weights 25 x 38 — 70, 80, 90, 100 and 120 in White only.

Warren's OFFSET ENAMEL is carried in stock by all Warren merchants and at the mill.

This demonstration is lithographed in four colors on Warren's OFFSET ENAMEL, basis 25 x 38 -- 80.

This paper is Warren's OFFSET ENAMEL, *basis* 25 x 38 – 80

WARREN'S OLDE STYLE Antique

S. D. WARREN CO. Warren's STANDARD Printing Papers BOSTON 1, MASS.

B

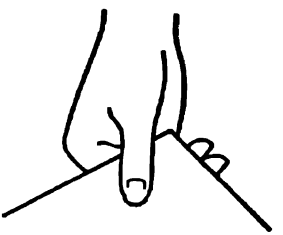
WARREN'S
OLDE STYLE
Antique

This paper is designed for the printing of type and line engravings by letterpress. Its mellow quality allows a clear and even impression.

Warren's OLDE STYLE—Antique is available in Wove and Laid finishes in White and India in the basis weights 25 x 38 — 50, 60, and 70.

OLDE STYLE is carried in stock by Warren merchants and at the mill.

This insert was printed by letterpress on Warren's OLDE STYLE—Antique Wove, White, basis 25 x 38 — 60.



HAMMERMILL
BOND

HAMMERMILL BOND has been the world's most widely sold and used watermarked bond paper for more than 45 years.

Today, Hammermill Bond is made from a blend of pulps including Hammermill's exclusive Neutracel[R] pulp. Quality features include a clean, bright white and a wide range of like-sided colors. It is a strong, durable sheet with good opacity and a superior typing, writing and erasing surface.

Hammermill Bond has a firm, level, outstandingly uniform printing surface. It takes fast, trouble-free impression by any of the common processes - letterpress or offset. It engraves beautifully, and is a preferred choice for stencil duplicating with "contact" drying inks.

HAMMERMILL BOND is made in four weights, in white and twelve colors in Bond and Ripplestone finishes, in twelve stock sizes for office and printshop production. Hammermill Bond Envelopes to match are available in thirteen standard sizes. If you will write on your business letterhead and mention this book, you may obtain free a copy of the "Working Kit of Hammermill Bond," a helpful book on designing "Your Next Letterhead," and a large sample book of Hammermill Bond with complete information about the range and availability of the line for your use. Address Hammermill Paper Company, 1516 East Lake Road, Erie 6, Pennsylvania.

CARLYLE & KENNEDY • Builders and Contractors

PHONE 6-0000 • 3260 OHIO DRIVE



WALLINGTON • CALIFORNIA

WARWICK JEWELERS

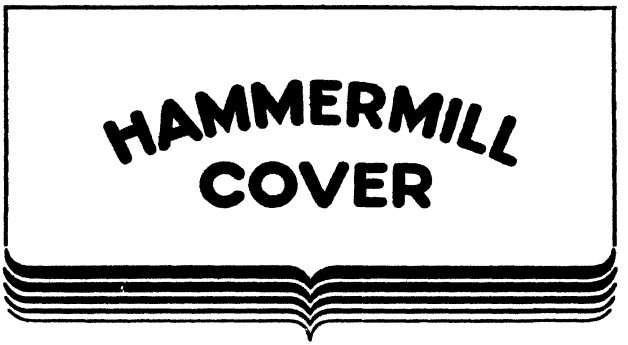
321 FLEMING COURT • PHONE 6-6321 • GILFORD • OREGON

Flowers by Lorette

12 CENTRAL ARCADE

PHONE 2-2310

HAMMERMILL BOND, *Substance 24, White, Bond finish*



The Work-and-Turn Cover Paper

HAMMERMILL COVER

provides beauty for advertising pieces that must win favorable attention at first glance

To that beauty it adds protection to whatever it encloses: catalogs, menus, programs, booklets, posters, price lists, broadsides, folders, self-mailers.

Hammermill Cover has a firm level surface for fine multicolor offset printing as well as for letterpress work. It is alike on both sides in color and finish, the true work-and-turn cover paper. There is a rainbow of popular, likesided colors. You can choose from a "Standard White" and the glowing "Radiant" White. Other features include a choice of Antique and Ripple finishes; unusual cleanliness; rugged yet resilient durability to withstand long, hard use, to emboss without breaking, to score and fold often and well.

YOUR CHOICE OF A WIDE RANGE OF ITEMS—

Colors—WHITE • RADIANT (white) CANARY • INDIA • SEPIA • BLACK • RED GOLD • BLUE • GRAY • GREEN

Sizes and Weights

SIZES	SINGLE THICK		DOUBLE THICK	
20 x 26	50	[3]	*65	[3] 130 [1]
26 x 40	100	[1.5]	*130	[1] ..
23 x 35	77.5	[3]	*100.5	[1.5] 201 [.5]

Above table gives actual weight per 500 sheets, which should be designated on every order.

Small numerals ([3]) indicate reams per carton.

***Finishes**—ANTIQUE in White and all colors in all sizes and weights.

RIPPLE in White and Radiant (white) in all stock sizes and weights—Ripple colors in these (*) sizes and weights.

Grain Direction

	20 x 26	23 x 35	26 x 40
ANTIQUE—ST..	Either	‡23"	Either
ANTIQUE—DT..	20"	23"	40"
RIPPLE.....	20"	23"	40"

‡*Whites, either; Colors, 23" only.*

If specific or opposite grain is required it *must be specified.* Long grain on 23x35—2000 pounds minimum. 26" grain on 20x26, 26" grain on 26x40, 35" grain on 23x35 Ripple finish—2000 pounds minimum. Irregular grain on DT items—2000 pounds minimum.

Packing—Single Thick, 250-sheet packages. Double Thick, 100-sheet packages.

Standard packing of all stock items is in cartons.

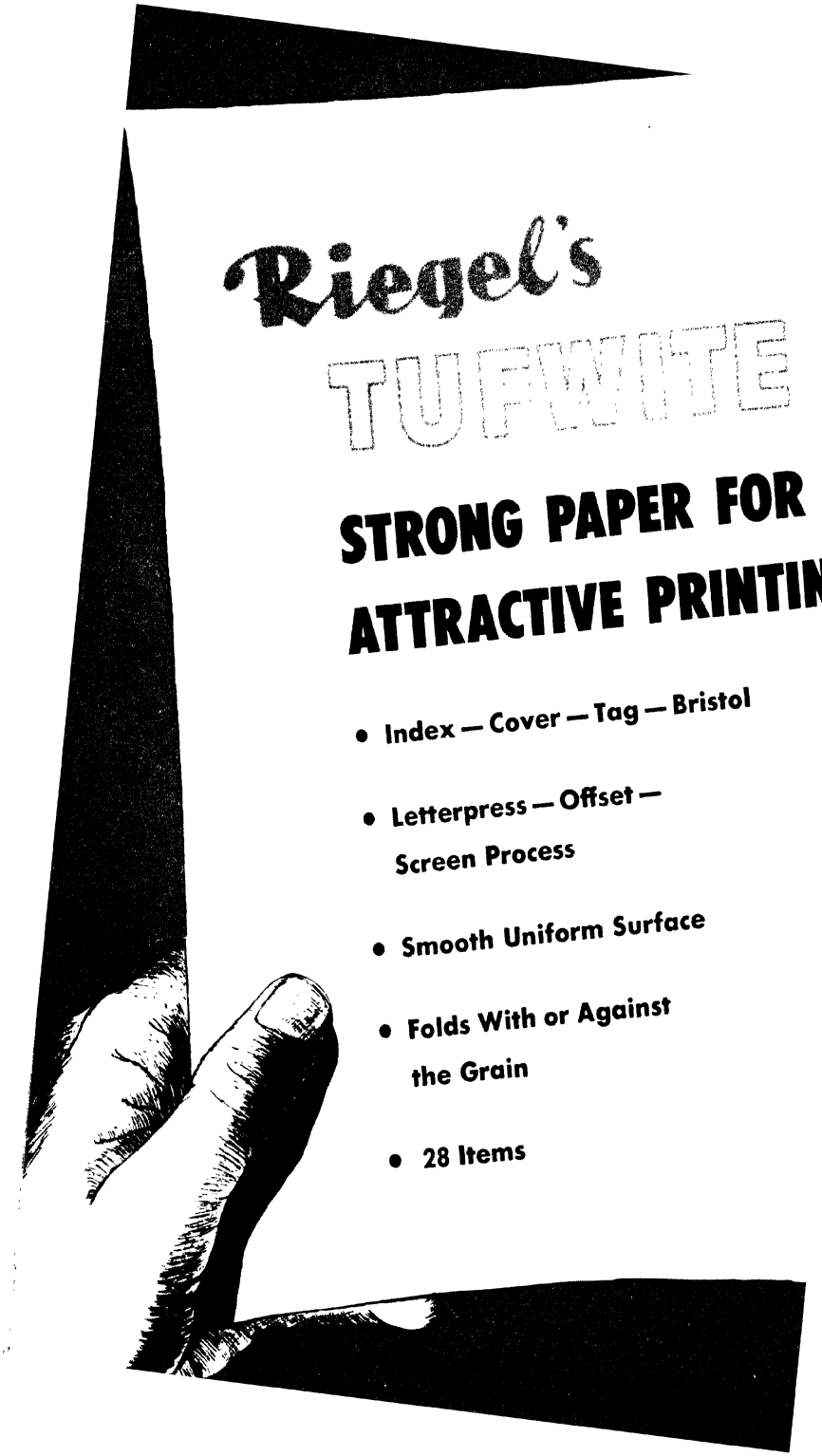
Printed by letterpress

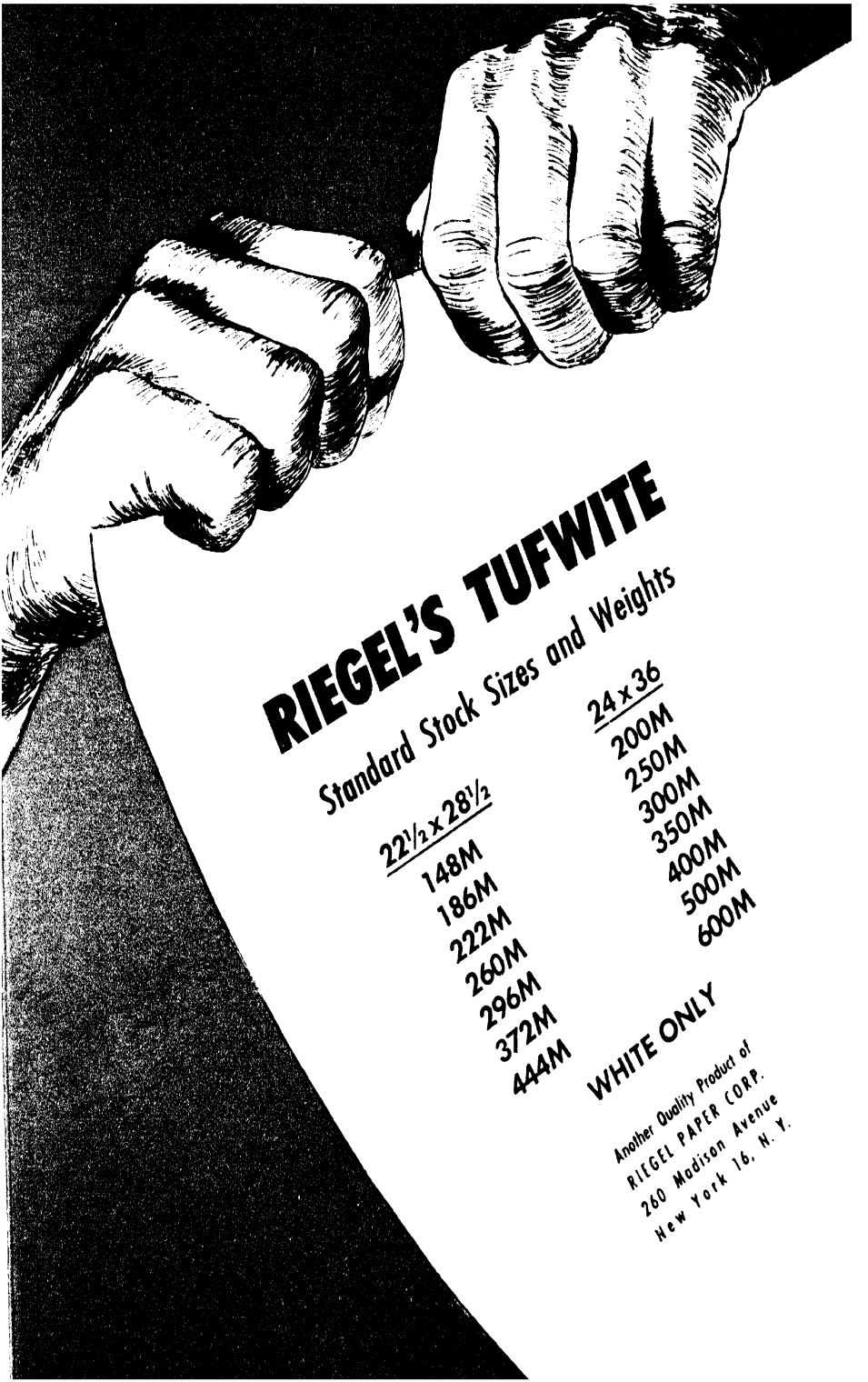

FLAME ROOM

HAMMERMILL COVER, *Substance 65, Green, Ripple finish*

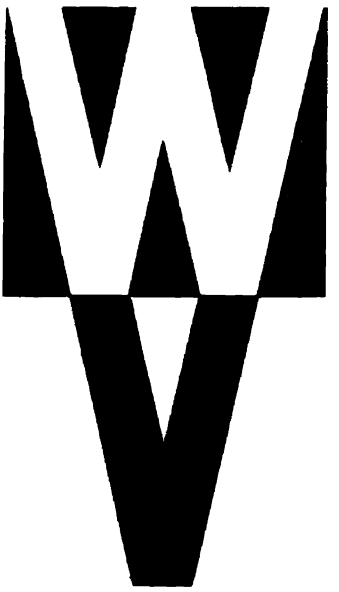


E


Riegel's
TUFWITE
STRONG PAPER FOR
ATTRACTIVE PRINTING
• Index — Cover — Tag — Bristol
• Letterpress — Offset —
Screen Process
• Smooth Uniform Surface
• Folds With or Against
the Grain
• 28 Items


RIEGEL'S TUFWITE
Standard Stock Sizes and Weights
22½ x 28½
148M
186M
222M
260M
296M
372M
444M
24 x 36
200M
250M
300M
350M
400M
500M
600M
WHITE ONLY
Another Quality Product of
RIEGEL PAPER CORP.
260 Madison Avenue
New York 16, N. Y.

Printed letterpress on
RIEGEL'S TUFWITE
24 x 36 — 250M



West Virginia Pulp and Paper Company

Westvaco Quality

Pinnacle Offset

G

Pinnacle Offset

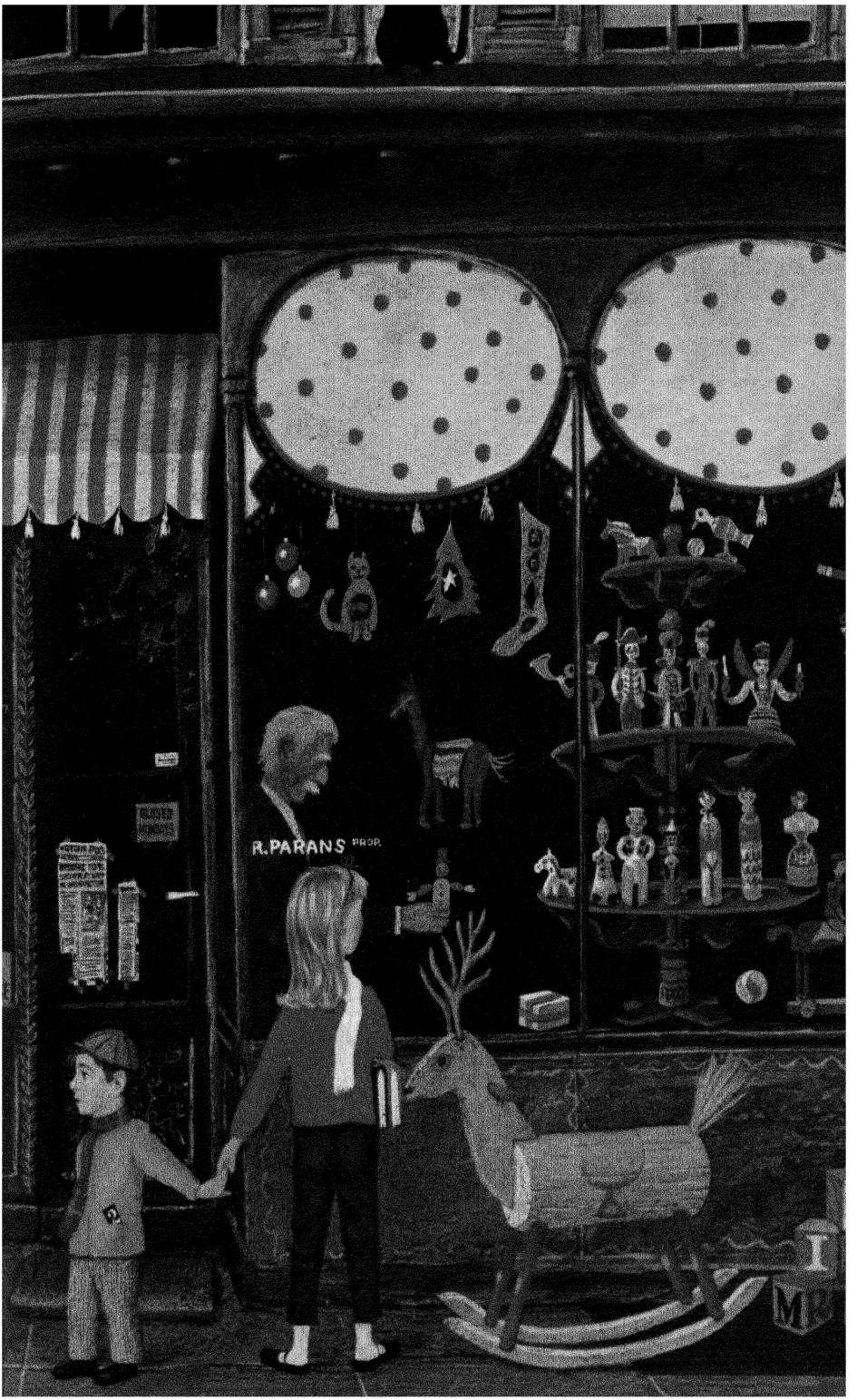
By

West Virginia Pulp and Paper Company

An uncoated offset paper provided in both regular and vellum finishes and in blue white and cream white colors. Available in all standard sheet and roll sizes, with making orders of 5000 pounds minimum. Basis weights: 50, 60, 70, 80 and 100 pounds

Printed by Offset Lithography
Four-Color Process,
133-Line Screen

Artist: Robert Sivard
Title: Detail from "Toy Shop"
Gallery: Midtown Galleries, New York


R. PARANS PROP.
ROASTED PEANUTS

Printed by offset lithography on
Pinnacle Offset, Blue White (Vellum)
25 x 38—70

Kromekote

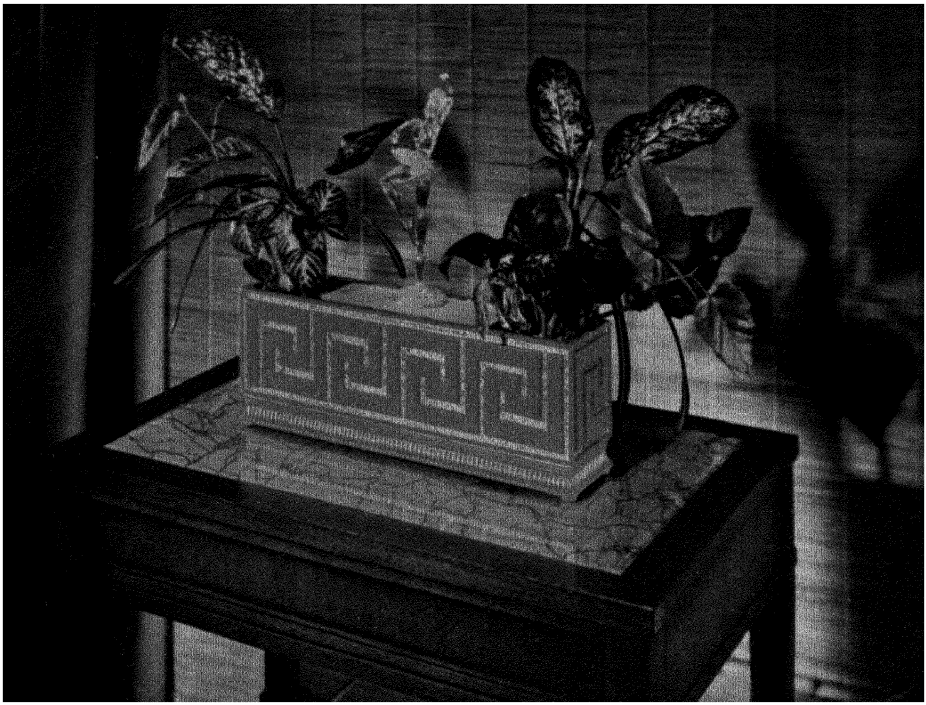
BRAND

CAST COATED TWO SIDES ENAMEL

for the finest reproduction



H



133 screen *Photograph by Marsh Photographers, Inc., Cincinnati*

Kromekote ENAMEL, CAST COATED TWO SIDES, is the ultimate in fine coated paper. It is the natural choice when the accent is on quality. KROMEKOTE is sensationally eye arresting and suggestive of elegance, taste, and luxury. It is highly recommended for deluxe books, catalogs, folders, and other printing jobs where the finest halftone results are desired.

Kromekote ENAMEL is made in white only in basis 25 x 38—80 and 100 lb. The KROMEKOTE line includes, in addition to enamel . . . litho, label, cover, postcard, and box wrap. It is manufactured only by

THE CHAMPION PAPER AND FIBRE COMPANY

HAMILTON, OHIO

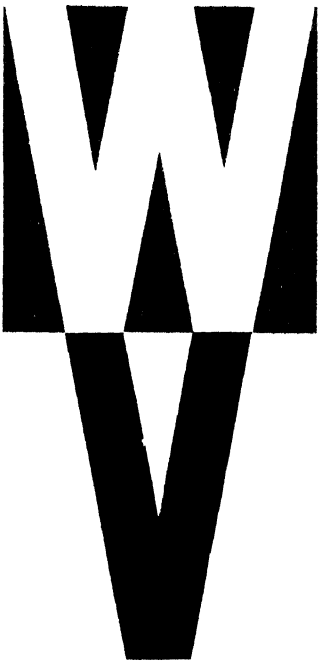
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133 screen

Photograph by Marsh Photographers, Inc., Cincinnati



This is letterpress printed on
KROMEKOTE Cast Coated Two Sides Enamel
Basis 25 x 38—100 lb.



West Virginia Pulp and Paper Company

Westvaco Quality

Sterling Letterpress Enamel

H-1

Sterling Letterpress Enamel

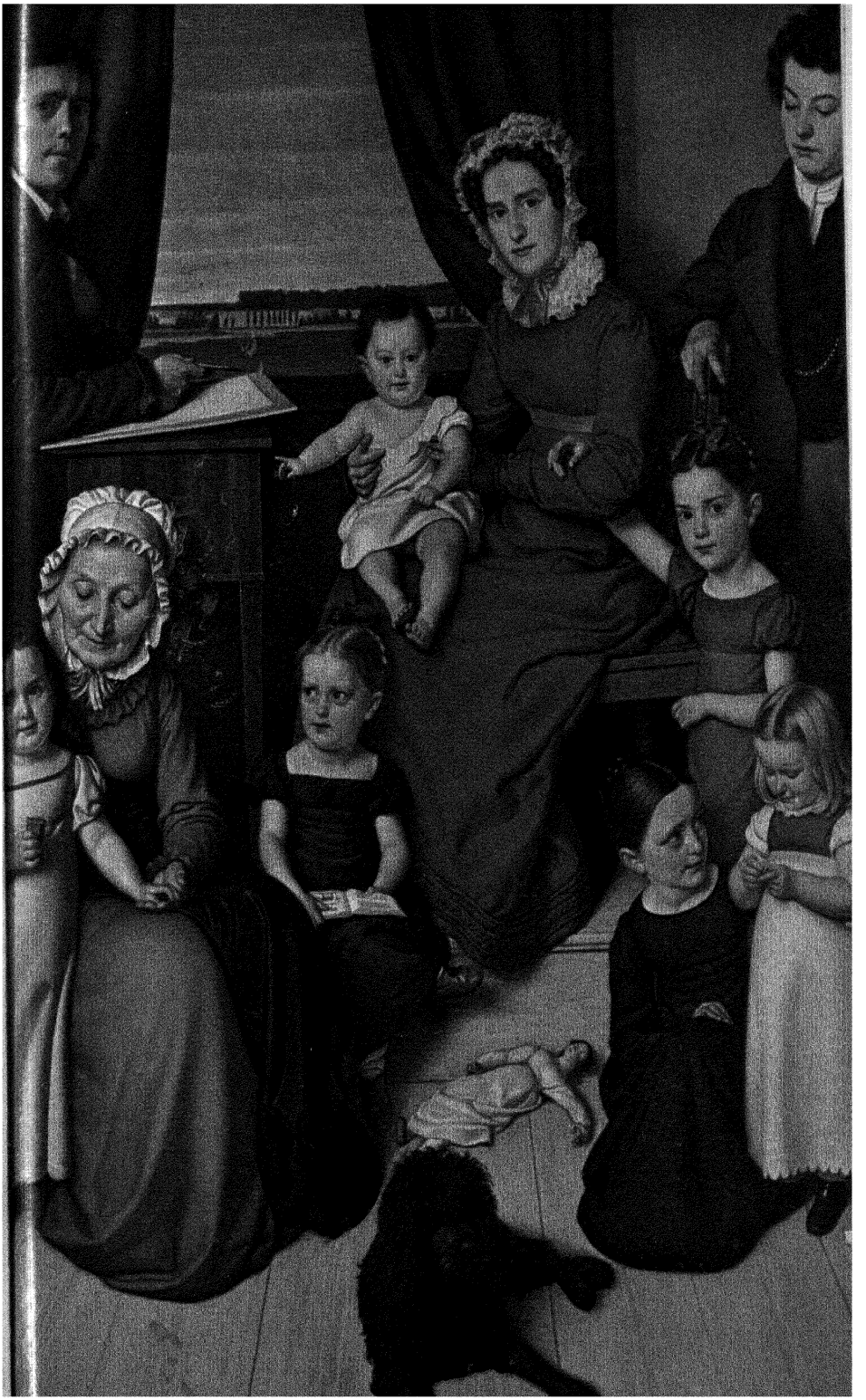
By

West Virginia Pulp and Paper Company

A coated letterpress paper, blue white in color. Available in all standard sheet and roll sizes, with making orders of 5000 pounds minimum. Basis weights: 60, 70, 80, 90, 100, 110 and 120 pounds.

Printed by Letterpress
Four-Color Process, 133-Line Screen

Artist: John Lewis Krimmel
Title: Detail from "The Artist Krimmel His Family, ca. 1820"
Gallery: National Gallery of Art, Washington, D. C., Mellon Collection



Alternate Gothic No. 1

36 pt. 9A 13a 7-1 Lower case alphabet 281 pts. Characters per pica 1.2

ALL KNIGHTS OF THE MIDDLE A
After an apprenticeship as pag

30 pt. 11A 17a 8-1 Lower case alphabet 229 pts. Characters per pica 1.5

JADE VARIES IN COLOR FROM WHITISH
It is used for jewelry or carved for or

Alternate Gothic No. 2

42 pt 6A 10a 5-1

THE XYLOPHONE, A MU
Dutch tulip bulbs are shi

36 pt. 7A 12a 5-1 Lower case alphabet 319 pts. Characters per pica 1 1

ALL KNIGHTS OF THE MIDD
After an apprenticeship as

30 pt. 9A 15a 7-1 Lower case alphabet 254 pts. Characters per pica 1.3

JADE VARIES IN COLOR FROM WH
It is used for jewelry or is carved

Alternate Gothic No. 3

42 pt. 5A 9a 4-1



36 pt. 6A 10a 5-1 Lower case alphabet 359 pts. Characters per pica .95



30 pt. 8A 13a 7-1 Lower case alphabet 300 pts. Characters per pica 1.1



News Gothic

36 pt 5A 9a 4-1 Lower case alphabet 417 pts. Characters per pica .82



30 pt. 6A 11a 5-1 Lower case alphabet 343 pts. Characters per pica 1.0



News Gothic Condensed

36 pt 7A 12a 5-1 Lower case alphabet 299 pts. Characters per pica 1.1

ALL KNIGHTS OF THE MID
After an apprenticeship as

30 pt. 9A 15a 7-1 Lower case alphabet 262 pts. Characters per pica 1.3

JADE VARIES IN MANY FORMS
It is used for jewelry or is carved

News Gothic Extra Condensed

42 pt. 10A 16a 7-1

THE XYLOPHONE, A MUSICAL INSTR
Dutch tulip bulbs are shipped to all

36 pt. 12A 18a 8-1 Lower case alphabet 203 pts. Characters per pica 1 7

ALL KNIGHTS OF THE MIDDLE AGES HAD
After an apprenticeship as page and some

30 pt. 15A 23a 10-1 Lower case alphabet 168 pts. Characters per pica 2.0

JADE VARIES IN COLOR FROM WHITISH TO DARK
It is used for jewelry or is carved for ornamental

Phenix

48 pt. 9A 14a 7-1

FINE QUALITY COLOR PRINTING
Zero is the figure or symbol of

36 pt 12A 19a 8-1 Lower case alphabet 203 pts Characters per pica 1 7

ALL KNIGHTS OF THE MIDDLE AGES HAD
After an apprenticeship as page and some

30 pt 15A 23a 10-1 Lower case alphabet 169 pts. Characters per pica 2.0

JADE VARIES IN COLOR FROM WHITISH TO DARK
It is used for jewelry or is carved for ornamental

Gothic No. 545

36 pt 4A 7a 3-1 Lower case alphabet 497 pts. Characters per pica .69

KNIGHTS OWN
After apprentices

30 pt. 4A 9a 4-1 Lower case alphabet 420 pts. Characters per pica .81

JADE HAS GREEN
It is used for jewelry

Gothic Condensed No. 529

42 pt. 7A 12a 5-1

THE XYLOPHONE, A MUSIC
Dutch tulip bulbs are shippe

36 pt. 9A 15a 7-1 Lower case alphabet 250 pts. Characters per pica 1.4

ALL KNIGHTS OF THE MEDIEVAL
After an apprenticeship as page a

30 pt. 10A 17a 7-1 Lower case alphabet 226 pts. Characters per pica 1.5

JADE VARIES IN COLOR FROM WHITE
It is used for jewelry and is carved for

Gothic Outline Title No. 6

30 pt. 7A 5-1

JADE VARIES FROM DARK
GREEN COLOR TO A LIGHT

24 pt. 9A 7-1

BRAZIL AND OTHER COUNTRIES
WERE SENDING TO PORTUGAL

Franklin Gothic Extra Condensed

48 pt. 5A 8a 4-1



42 pt. 6A 9a 4-1



36 pt. 7A 11a 5-1 Lower case alphabet 326 pts. Characters per pica 1.0



Franklin Gothic

36 pt 4A 7a 3-1 Lower case alphabet 501 pts Characters per pica 68



30 pt. 5A 9a 4-1 Lower case alphabet 417 pts. Characters per pica 82



24 pt. 6A 11a 5-1 Lower case alphabet 349 pts. Characters per pica .98



Franklin Gothic Italic

36 pt 4A 6a 3-1 Lower case alphabet 528 pts. Characters per pica 65





Franklin Gothic Wide

42 pt. 3A 5a 3-1

HIS KNIGHT
Apprentices

36 pt. 3A 5a 3-1 Lower case alphabet 620 pts. Characters per pica .55

XYLOPHONIC
Dutch tulips of

Condensed Title Gothic No. 11

36 pt. 6A 5-1

ALL THE KNIGHTS OF
THE APPRENTICESHIP

30 pt. 7A 5-1

JADE VARIES FROM WHITE
IT IS USED FOR JEWELRY

Railroad Gothic

60 pt. 4A 3-1

QUALITY PIN

48 pt. 4A 3-1

GENERAL PLAN

Bernhard Gothic Light

42 pt. 4A 9a 4-1

XYLOGRAPHY IS
Dutch tulip bulbs are

36 pt. 5A 10a 4-1 Lower case alphabet 371 pts. Characters per pica 92

ALL KNIGHTS WERE
After an apprenticeship

30 pt. 6A 12a 5-1 Lower case alphabet 311 pts. Characters per pica 1.1

JADE VARIES IN COLOR
It is used for costume jewels

Bernhard Gothic Medium

42 pt 4A 8a 4-1

XYLOPHONE IS
Dutch tulip bulbs on

36 pt 5A 10a 4-1 Lower case alphabet 369 pts Characters per pica .92

THE KNIGHTS ARE
After apprenticeship of

Bernhard Gothic Medium Italic

30 pt 5A 11a 4-1 Lower case alphabet 311 pts Characters per pica 1 1

JADE VARIES IN TONE
It is hand carved for jewelry
and ranges from a yellow to

24 pt. 6A 13a 5-1 Lower case alphabet 260 pts. Characters per pica 1 3

BRAZIL AND THE OTHERS
It shows that civilization at a time
so remote could establish at that

Bernhard Gothic Medium Condensed

36 pt. 6A 13a 5-1 Lower case alphabet 293 pts. Characters per pica 1.2

ALL KNIGHTS ARE THE
After an apprentice begins a

30 pt. 8A 15a 7-1 Lower case alphabet 244 pts. Characters per pica 1.4

JADE VARIES COLORS INTO
It is used for jewelry wherever you

Bernhard Gothic Extra Heavy

42 pt. 3A 5a 3-1

A XYLOPHONE
Dutch tulips are

36 pt. 4A 7a 4-1 Lower case alphabet 458 pts. Characters per pica .75

ALL KNIGHTS OF
The apprentice has

30 pt. 5A 9a 4-1 Lower case alphabet 378 pts. Characters per pica .91

JADE COLORS VARY
It is used for jewelry or

BANK GOTHIC LIGHT...

18 pt. No 10 6A 4-1

FINE QUALITY PRINTING

18 pt. No. 9 7A 5-1

ZERO IS A SYMBOL FOR THE

12 pt No 8 10A 7-1

DUTCH TULIP BULBS ARE GROWN

BANK GOTHIC MEDIUM...

18 pt No. 20 5A 4-1

FINE QUALITY PRINTING

18 pt No 19 7A 5-1

ZERO IS A SYMBOL FOR THE

12 pt No. 18 10A 5-1

DUTCH TULIP BULBS CAN GROW

12 pt No. 17 12A 8-1

JADE VARIES IN COLOR FROM WHITISH

BANK GOTHIC CONDENSED MEDIUM...

18 pt No. 50 8A 5-1

FINE QUALITY COLOR PRINTING

18 pt. No. 49 9A 7-1

ZERO IS THE FIGURE OR SYMBOL FOR

12 pt. No. 48 14A 8-1

DUTCH TULIP BULBS ARE SHIPPED THROUGH

12 pt. No. 47 17A 9-1

JADE VARIES IN COLOR FROM WHITISH TO A DARK

COPPERPLATE GOTHIC LIGHT...

24 pt. No. 10 4A 4-1

RENUMBER

24 pt. No. 9 5A 4-1

HARMONIOUS

COPPERPLATE GOTHIC HEAVY

24 pt. No. 30 4A 4-1

ENDANGER

24 pt No. 29 5A 4-1

INSTRUCTION

COPPERPLATE GOTHIC BOLD...

24 pt. No. 50 4A 4-1

EMBRACED

24 pt. No. 49 5A 4-1

RETRIBUTION

COPPERPLATE GOTHIC ITALIC...

24 pt. No. 60 4A 3-1

MOLECULE

24 pt. No. 59 5A 4-1

CONDENSING

COPPERPLATE GOTHIC LIGHT CONDENSED...

24 pt. No. 40 6A 4-1

BRIDGES

24 pt. No. 39 7A 5-1

PROSPECT

18 pt. No. 40 8A 7-1

EXPOSITION

COPPERPLATE GOTHIC HEAVY CONDENSED

24 pt. No. 20 6A 4-1

HONORS

24 pt No 19 7A 5-1

EXCLUDED

18 pt. No 20 8A 7-1

IMPRESSIVE

COPPERPLATE GOTHIC HEAVY EXTENDED

24 pt. No. 80 3A 3-1

MENDING

24 pt. No. 79 4A 3-1

RESOURCE

COPPERPLATE GOTHIC LIGHT EXTENDED...

24 pt. No. 70 4A 3-1

ENSURED

24 pt. No. 69 4A 3-1

RIGHTEOUS

STEELPLATE GOTHIC BOLD

36 pt. 3A 4-1

THE FIRST
HAND MAD

Spartan Medium

42 pt. 4A 8a 4-1

SOME xylophones

36 pt. 5A 9a 4-1 Lower case alphabet 404 pts. Characters per pica .85

KNIGHTS usually are

Spartan Medium Italic

36 pt. 5A 9a 4-1 Lower case alphabet 399 pts. Characters per pica .86

ALL HERO KNIGHTS
After the apprentices

30 pt. 6A 12a 5-1 Lower case alphabet 319 pts. Characters per pica 1.1

JADE VARIES IN COLOR
It is used for jewelry or for

Spartan Heavy

42 pt. 4A 6a 3-1



36 pt. 4A 8a 3-1 Lower case alphabet 469 pts. Characters per pica .73



Spartan Heavy Italic

36 pt. 4A 8a 4-1 Lower case alphabet 468 pts. Characters per pica .73



30 pt. 5A 10a 4-1 Lower case alphabet 370 pts. Characters per pica .93



Spartan Black

42 pt. 3A 5a 3-1



36 pt. 4A 6a 3-1 Lower case alphabet 542 pts. Characters per pica .63



Spartan Black Italic

36 pt. 4A 6a 3-1 Lower case alphabet 540 pts. Characters per pica .63

ALL KNIGHTS OF
And apprentices

30 pt. 5A 9a 4-1 Lower case alphabet 430 pts. Characters per pica .79

JADE COLORS VARY
It is used for jewelry

Spartan Black Condensed

48 pt. 5A 8a 3-1

FINER color quality

42 pt. 5A 9a 4-1

THE xylophone music

Spartan Black Condensed Italic

36 pt. 6A 10a 5-1 Lower case alphabet 355 pts. Characters per pica .96

ALL KNIGHTS OF MIDDLE
After the apprenticeship

Spartan Extra Black

36 pt. 3A 6a 3-1 Lower case alphabet 594 pts. Characters per pica .58

FOUR KNIGHTS
After an appeal

30 pt. 5A 8a 4-1 Lower case alphabet 466 pts. Characters per pica .73

JADE COLORS ARE
It is used for jewels

Spartan Book

24 point

BRAZIL AND OTHER COUNTRIES
It showed civilization at that time so

Spartan Medium Condensed

36 point Lower case alphabet 321 pts. Characters per pica 1 0

KNIGHTS WERE OF NOBLE
After an apprenticeship as

30 point Lower case alphabet 256 pts. Characters per pica 1.3

JADE GREEN COLORS CAN VARY
It is used for jewelry or carved for

Stymie Light

36 pt. 5A 8a 4-1 Lower case alphabet 437 pts Characters per pica .78

ALL KNIGHTS ARE
After an apprentice
ship and working for

30 pt. 5A 10a 5-1 Lower case alphabet 353 pts. Characters per pica 95

JADE VARIES IN COLO
It is used for jewelry or is
carved for ornamental or

Stymie Medium

36 pt. 4A 8a 4-1 Lower case alphabet 446 pts Characters per pica .77

ALL KNIGHTS OF
After an apprentice

30 pt. 5A 10a 4-1 Lower case alphabet 380 pts. Characters per pica .90

JADE COLORS VARY
It is used for jewelry or

Stymie Bold

36 pt. 3A 6a 3-1 Lower case alphabet 489 pts. Characters per pica .70

FOUR KNIGHTS
After an appeal of

30 pt. 4A 8a 3-1 Lower case alphabet 402 pts. Characters per pica .85

JADE COLORS ARE
It is used for jewelry or

Stymie Bold Italic

36 pt 3A 6a 3-1 Lower case alphabet 496 pts Characters per pica 68

KNIGHTS CALL
After an apprenti

30 pt. 4A 8a 3-1 Lower case alphabet 404 pts. Characters per pica .85

JADE COLORS ARE
It is utilized for jewels

Stymie Black

36 pt. 4A 7a 3-1 Lower case alphabet 529 pts. Characters per pica .65

SOME KNIGHTS
After an apprent

30 pt. 5A 8a 4-1 Lower case alphabet 439 pts. Characters per pica .78

JADE VARIES MOST
It is used for jewelry
or carved for others

Stymie Black Italic

36 pt. 3A 6a 3-1 Lower case alphabet 545 pts. Characters per pica .63

FIVE KNIGHTS
After an appeal
for some of the

30 pt. 4A 8a 3-1 Lower case alphabet 454 pts. Characters per pica .76

JADE COLOR HAS
It is used for jewels

Stymie Bold Condensed

36 pt. 7A 11a 5-1 Lower case alphabet 332 pts. Characters per pica 1.0

ALL KNIGHTS OF MIDDLE
After an apprenticeship at

30 pt. 9A 13a 7-1 Lower case alphabet 278 pts. Characters per pica 1.2

JADE VARIES IN COLOR FROM
It is used for jewelry or carving

Tower

36 pt. 7A 13a 7-1 Lower case alphabet 296 pts. Characters per pica 1.2

ALL KNIGHTS OF THE MID
After an apprenticeship as a

Contact Bold Condensed

36 pt. 6A 10a 5-1 Lower case alphabet 371 pts. Characters per pica .92

SEVEN KNIGHTS OF THE
After an apprenticeship

Contact Bold Condensed Italic

36 pt. 5A 8a 4-1 Lower case alphabet 386 pts. Characters per pica .89

KNIGHTS OF THE AGES
After an apprentice is

30 pt. 7A 10a 5-1 Lower case alphabet 313 pts. Characters per pica 1.1

JADE COLORS VARY IN MANY
It is used for jewelry or for

P. T. Barnum

36 pt. 5A 9a 5-1 Lower case alphabet 429 pts. Characters per pica .79

ALL KNIGHTS OF
After the apprentice

30 pt. 7A 13a 7-1 Lower case alphabet 306 pts. Characters per pica 1.1

JADE VARIES IN COLOR
It is used for jewelry, carving

Lydian

24 pt. 6A 13a 7-1 Lower case alphabet 283 pts Characters per pica 1 2

BRAZIL AND SOME COUNTR
It shows civilization at the time

30 pt. 5A 11a 5-1 Lower case alphabet 344 pts Characters per pica 1 0

JADE VARIES IN COLOR
It is used for jewelry and

Lydian Italic

24 pt. 9A 15a 7-1 Lower case alphabet 253 pts Characters per pica 1.3

BRAZIL AND SOME COUNTRIES
It shows civilization at the time so

30 pt. 7A 12a 5-1 Lower case alphabet 314 pts Characters per pica 1 1

JADE VARIES IN COLOR
It is used for jewelry or carve

Lydian Bold

30 pt. 5A 11a 5-1 Lower case alphabet 348 pts. Characters per pica .98

ALL Knights of the midd

36 pt. 4A 9a 4-1 Lower case alphabet 422 pts. Characters per pica .81

SOME Knights of the

Lydian Bold Italic

24 pt. 8A 14a 7-1 Lower case alphabet 272 pts. Characters per pica 1.3

BRAZIL, CHILE WITH OTHERS
It shows civilization at a time so

30 pt 6A 11a 5-1 Lower case alphabet 341 pts. Characters per pica 1.0

JADE VARIES IN COLOR
It is used for jewelry or is

Lydian Bold Condensed

24 pt. 11A 17a 9-1 Lower case alphabet 228 pts. Characters per pica 1.5

BRAZIL AND OTHER COUNTRIES ARE
It shows civilization at a time so far a

30 pt. 9A 13a 7-1 Lower case alphabet 282 pts. Characters per pica 1.2

JADE VARIES IN COLOR FROM
It is used for jewelry or is carve

Lydian Bold Condensed Italic

24 pt. 11A 17a 9-1 Lower case alphabet 227 pts. Characters per pica 1.5

BRAZIL AND OTHER COUNTRIES WERE
It shows civilization at a time so far a

30 pt. 9A 13a 7-1 Lower case alphabet 286 pts. Characters per pica 1.2

JADE VARIES IN COLOR FROM
It is used for jewelry or carved

Huxley Vertical

48 pt 9A 7-1

ZERO IS THE FIGURE O, WHICH
STANDS AS A SYMBOL FOR ITS

36 pt 11A 8-1

ALL KNIGHTS OF THE MEDIEVAL AGES
WERE MOSTLY MEN OF NOBLE BIRTH

Empire

48 pt 9A 7-1

ZERO IS THE FIGURE OR SYMBOL

36 pt. 12A 8-1

ALL KNIGHTS OF THE MIDDLE AGES WERE

Dom Bold

24 pt. 10A 18a 8-1 Lower case alphabet 202 pts. Characters per pica 1.7

BRAZIL AND OTHER COUNTRIES ARE
It shows civilization at a time so remote

30 pt. 8A 14a 6-1 Lower case alphabet 250 pts. Characters per pica 1 4

JADE VARIES IN COLOR FROM
It is used for jewelry or is carved

Dom Casual

24 pt. 10A 19a 7-1 Lower case alphabet 183 pts. Characters per pica 1.9

BRAZIL AND OTHER COUNTRIES ARE
It shows civilization at a time so remote that

30 pt 8A 15a 5-1 Lower case alphabet 225 pts. Characters per pica 1.5

JADE VARIES IN COLOR FROM
It is used for jewelry or is carved for

Dom Diagonal

24 pt. 10A 20a 7-1 Lower case alphabet 186 pts. Characters per pica 1.8

BRAZIL AND OTHER COUNTRIES ARE
It shows civilization at a time so remote the

30 pt. 8A 15a 6-1 Lower case alphabet 229 pts. Characters per pica 1.5

JADE VARIES IN COLOR FROM
It is used for jewelry or carved for

Balloon Extrabold

24 pt. 8A 7-1

BRAZIL OR OTHER COUNTRIES WERE SENDING POTTERY TO

30 pt 6A 5-1

JADE COLORS CAN VARY

Cooper Black

12 pt 15A 27a 10-1 Lower case alphabet 195 pts Characters per pica 1.7

THE EARLY PRINTERS CAST THEIR OWN They instructed some local blacksmith to make the iron frames or chases in which the types

14 pt. 12A 21a 9-1 Lower case alphabet 240 pts Characters per pica 1.4

THE EARLY PRINTERS CAST THEIR They instructed some local blacksmith to make the iron frames or chases in

Caslon Oldstyle No. 471

36 pt. 5A 9a 5-1 Lower case alphabet 405 pts Characters per pica .84

ALL THE KNIGHTS After apprenticeship a

30 pt 6A 11a 7-1 Lower case alphabet 315 pts. Characters per pica .97

JADE VARIES IN COLOR Is used for jewelry or carved

Caslon Oldstyle Italic No. 471

36 pt 4A 10a 5-1 Lower case alphabet 371 pts Characters per pica .92

SOME KNIGHTS
After those apprentices

30 pt. 5A 13a 7-1 Lower case alphabet 284 pts Characters per pica 1.2

JADE COLOR VARIES
It is used for jewelry or carved
for ornamental purposes and is

Caslon No. 540

36 pt. 3A 7a 4-1 Lower case alphabet 494 pts. Characters per pica .70

THE KNIGHTS
Apprentices must

30 pt. 4A 8a 5-1 Lower case alphabet 404 pts. Characters per pica .85

JADE COLORS ARE
It is used for jewelry

Caslon Italic No. 540

36 pt. 4A 8a 5-1 Lower case alphabet 428 pts. Characters per pica .80

ALL Knights of the

30 pt. 4A 9a 5-1 Lower case alphabet 383 pts. Characters per pica .89

USED for jewelry or

New Caslon

30 pt. 5A 10a 5-1 Lower case alphabet 393 pts. Characters per pica .87

COLORS VARY ON
It is used for jewelry or

24 pt. 5A 12a 7-1 Lower case alphabet 328 pts. Characters per pica 1.0

BRAZIL AND OTHER
Shows civilization at a time

New Caslon Italic

30 pt. 5A 10a 5-1 Lower case alphabet 343 pts. Characters per pica .99

COLORS WILL VARY
It is often used on jewelry

24 pt. 6A 12a 7-1 Lower case alphabet 287 pts. Characters per pica 1.2

BRAZIL AND ANOTHER
It shows civilization at a time

Caslon Bold

36 pt. 4A 7a 3 1 Lower case alphabet 521 pts Characters per pica .65

THE KNIGHTS
Apprentice serve

30 pt 5A 9a 4-1 Lower case alphabet 429 pts. Characters per pica .80

COLORS CHANGE
It is used for jewelry

Garamond Italic

36 pt 5A 11a 5 1 Lower case alphabet 311 pts Characters per pica 1 1

SIX KNIGHTS CAME
After the apprenticeship has

30 pt 6A 13a 7-1 Lower case alphabet 265 pts Characters per pica 1 3

JADE VARIES IN COLORS
It is suited for jewelry or carved
for ornamental purposes and has

Caslon Bold Condensed

36 pt. 5A 9a 4-1 Lower case alphabet 392 pts. Characters per pica .87

SOME KNIGHTS OF
After an apprentice as

30 pt. 6A 11a 5-1 Lower case alphabet 326 pts. Characters per pica 1.0

JADE VARIES IN COLOR
It is used for jewelry or is

Garamond

36 pt 5A 10a 6-1 Lower case alphabet 364 pts. Characters per pica .94

ALL KNIGHTS OF A
After the apprenticeship

30 pt. 6A 11a 7-1 Lower case alphabet 306 pts. Characters per pica 1 1

JADE VARIES A SHADE
It is used on jewelry or with

24 pt. 8A 15a 8-1 Lower case alphabet 249 pts. Characters per pica 1.4

BRAZIL, CHILE AND OTHER
It shows civilization at the time so

Garamond Bold

36 pt. 5A 9a 5-1 Lower case alphabet 402 pts Characters per pica .85

ALL THE KNIGHTS
After an apprentice is

30 pt. 6A 11a 5-1 Lower case alphabet 338 pts Characters per pica 1 0

JADE VARIES IN MORE
It is used for jewelry or cut

24 pt. 7A 13a 8-1 Lower case alphabet 276 pts Characters per pica 1 2

BRAZIL AND OTHER SUCH
It shows civilization at a time so

Garamond Bold Italic

36 pt 5A 10a 5-1 Lower case alphabet 361 pts Characters per pica 94

KNIGHTS WERE OF
After an apprenticeship

30 pt. 6A 12a 7-1 Lower case alphabet 304 pts. Characters per pica 1.1

JADE VARIES IN MORE
It is carved with ornamental

Goudy Bold

36 pt. 4A 8a 4-1 Lower case alphabet 448 pts. Characters per pica .70

SOME KNIGHTS
After an apprentice

30 pt 5A 9a 5-1 Lower case alphabet 367 pts Characters per pica .93

JADE COLORS CAN
It is used for jewelry or

Goudy Bold Italic

36 pt 4A 8a 4-1 Lower case alphabet 428 pts. Characters per pica .80

ALL KNIGHTS IN
After the apprentice

30 pt 5A 10a 5-1 Lower case alphabet 352 pts. Characters per pica .97

JADE COLORS VARY
It is used for jewelry or

24 pt. 6A 12a 7-1 Lower case alphabet 290 pts. Characters per pica 1.2

BRAZIL AND CHILE ARE
It shows civilization at a time

De Roos Roman

36 pt. 5A 9a 6-1 Lower case alphabet 367 pts. Characters per pica .93

THE KNIGHTS OF A
After the apprenticeship

30 pt. 6A 12a 7-1 Lower case alphabet 300 pts. Characters per pica 1.1

JADE VARIES IN COLOR
It is suited for jewelry or for ornamental purposes and has

De Roos Italic

36 pt. 5A 11a 5-1 Lower case alphabet 331 pts. Characters per pica 1.0

ALL KNIGHTS OF THE
After an apprenticeship as page and squire, the knight

30 pt. 7A 13a 5-1 Lower case alphabet 274 pts. Characters per pica 1.2

JADE COLOR VARIES ON
It is used for jewelry and carved

Century Oldstyle

10 pt 19A 38a 17 1 1 c 138 pts , 2 5 ch p p

THE EARLY PRINTER CAST
THEY INSTRUCTED a local black
smith to make the iron frame

8 pt 20A 42a 21 1 1 c 108 pts , 3 2 ch p p

EARLY PRINTERS CAST THEIR
THEY INSTRUCTED some local black
smith to make the iron frame or
chases in which types are confined

Century Oldstyle Italic

10 pt 18A 40a 13 1 1 c 130 pts , 2 6 ch p p

EARLY PRINTERS CAST
They instructed a local black
smith to make the iron frame

8 pt 20A 45a 17 1 1 c 99 pts , 3 4 ch p p

EARLY PRINTERS CAST THEIR
They instructed some local blacksmith
to make the iron frame or chases in

Century Oldstyle Bold

10 pt 17A 34a 11 1 1 c 116 pts , 2 1 ch p p

THE EARLY PRINTER
They instructed the local
blacksmith to make the

8 pt 18A 38a 13 1 1 c 125 pts , 2 7 ch p p

THE EARLY PRINTER CAST
They instructed the local black
smith to make the iron frame or
chases in which the types are

Century Expanded

24 pt 6A 11a 7 1 1 c 312 pts , 1 1 char p pica

PERU and one

18 pt 9A 18a 9 1 1 c 242 pts , 1 4 char p pica

THE Early Printer

14 pt 13A 26a 11 1 1 c 191 pts , 1 8 char p pica

THE Early Printer cast

12 pt 16A 32a 12 1 1 c 160 pts 2 1 char p pica

THE EARLY Printer cast the

10 pt 18A 37a 15 1 1 c 143 pts 2 4 char p pica

THEY INSTRUCTED a local black
smith to make the iron frame or

Century Expanded Italic

24 pt 6A 11a 7-1 1 c 304 pts , 1 1 char p pica

PERU has too

18 pt 8A 18a 9 1 1 c 243 pts , 1 4 char p pica

THE Early Print

14 pt 13A 27a 11 1 1 c 186 pts , 1 8 char p pica

THE Early Printer did

12 pt 15A 34a 12 1 1 c 153 pts , 2 2 char p pica

THEY instructed some local
blacksmith to make the iron

Century Schoolbook

30 pt 5A 10a 5-1 Lower case alphabet 369 pts Characters per pica 92

JADE COLOR VARIES
It is used for jewelry or
carved into ornamental

24 pt 7A 12a 7-1 Lower case alphabet 309 pts Characters per pica 1 1

ARGENTINA AND OTHER
Shows civilization at a time
so remote that it is doubtful

Century Schoolbook Italic

30 pt 5A 10a 5-1 Lower case alphabet 362 pts Characters per pica .94

COLORS WILL VARY
It is used for jewelry or
carved with ornamental

24 pt 6A 12a 7-1 Lower case alphabet 301 pts Characters per pica 1 1

PORTUGAL AND OTHER
Civilization was so remote at
that time it is doubtful there

Century Schoolbook Bold

30 pt. 5A 9a 5-1 Lower case alphabet 415 pts. Characters per pica .82

JADE COLORS ARE
It is used for jewelry,
carved for ornaments

24 pt. 6A 10a 5-1 Lower case alphabet 343 pts Characters per pica 99

GERMANY AND OTHER
It shows civilization at a

Century Bold

30 pt 5A 9a 5-1 Lower case alphabet 376 pts Characters per pica 93

JADE VARIES in color

24 pt 7A 12a 7-1 Lower case alphabet 310 pts Characters per pica 1 1

BRAZIL AND other nations

Century Bold Condensed

36 pt 7A 11a 5-1 Lower case alphabet 320 pts Characters per pica 1 0

KNIGHTS OF THE MIDDLE
After an apprenticeship as

30 pt. 9A 14a 7-1 Lower case alphabet 262 pts Characters per pica 1.3

JADE VARIES IN COLOR FROM
It is used for jewelry on certain

Cheltenham Oldstyle

24 pt. 6A 14a 7-1 Lower case alphabet 240 pts. Characters per pica 1.

BRAZIL AND THE OTHER
It shows civilization at that time so

18 pt. 8A 23a 8-1 Lower case alphabet 189 pts. Characters per pica 1.8

THE EARLY PRINTER CAST HIS
They instructed some local blacksmith to do

Cheltenham Medium

30 pt. 6A 11a 5-1 Lower case alphabet 328 pts. Characters per pica 1.0

JADE Varies in color from

24 pt. 7A 14a 7-1 Lower case alphabet 271 pts. Characters per pica 1.2

BRAZIL AND THE NATIONS
It shows civilization at a time so

Cheltenham Bold

36 pt. 4A 9a 4-1 Lower case alphabet 436 pts. Characters per pica .78

ALL KNIGHTS OF
After an apprentice

30 pt. 5A 11a 5-1 Lower case alphabet 354 pts. Characters per pica .96

JADE COLOR VARIES
It is used for jewelry or

Cheltenham Bold Condensed

36 pt 6A 11a 5-1 Lower case alphabet 348 pts Characters per pica .98

ALL KNIGHTS OF THE
After an apprenticeship a

30 pt 7A 13a 7-1 Lower case alphabet 284 pts Characters per pica 1 2

JADE VARIES IN COLORFUL
It is used for jewelry or carved

Cheltenham Bold Extra Condensed

42 pt 6A 11a 5-1

THE XYLOPHONE SOUND
Dutch tulip bulbs are taken

36 pt 8A 13a 5-1 Lower case alphabet 273 pts Characters per pica 1 2

ALL KNIGHTS OF MEDIEVAL
After an apprenticeship is over

30 pt 10A 16a 8-1 Lower case alphabet 224 pts. Characters per pica 1.5

JADE COLOR VARIES FROM THEIR
It is used for jewelry or carved from

Cheltenham Bold Extended

30 pt 4A 8a 3-1 Lower case alphabet 491 pts. Characters per pica .70

JADE GREEN OR
It is often used for
jewelry as a decor

24 pt 5A 9a 1 1 Lower case alphabet 403 pts Characters per pica .85

BRAZIL AND OTHER
It shows civilization at

Bulmer Roman

36 pt. 5A 10a 5-1 Lower case alphabet 343 pts Characters per pica .99

ALL KNIGHTS WILL
After an apprenticeship

30 pt. 6A 12a 7-1 Lower case alphabet 308 pts. Characters per pica 1 1

JADE VARIES IN COLO
It is used on jewelry or carved

24 pt. 8A 14a 8-1 Lower case alphabet 251 pts Characters per pica 1.5

BRAZIL WITH OTHER COUN
It presents civilization at a time so

Bulmer Italic

36 pt. 5A 10a 5-1 Lower case alphabet 336 pts Characters per pica 1 0

ALL KNIGHTS CAME
After an apprenticeship as
page and squire, a knight

30 pt. 6A 12a 7-1 Lower case alphabet 284 pts. Characters per pica 1.2

JADE VARIES IN COLOR
It is used for jewelry or carved
for ornamental purposes with

Bodoni

36 pt. 5A 9a 5-1 Lower case alphabet 387 pts. Characters per pica .88

SOME KNIGHTS OF
After an apprentice as

30 pt. 6A 11a 5-1 Lower case alphabet 326 pts. Characters per pica 1.0

JADE VARIES IN COLOR
It is used for jewelry or is

Bodoni Italic

30 pt. 6A 11a 5-1 Lower case alphabet 323 pts Characters per pica 1.0

JADE COLORS HAVE IN
It is used for jewelry and is

24 pt. 8A 13a 7-1 Lower case alphabet 262 pts. Characters per pica 1.3

BRAZIL AND COUNTRIES OF
It shows civilization at a time so far advanced that modern design

Bodoni Bold

36 pt 5A 8a 4-1 Lower case alphabet 420 pts. Characters per pica .81

ALL Knights of the

30 pt 5A 10a 5-1 Lower case alphabet 352 pts. Characters per pica .97

JADE varies in color an

Bodoni Bold Italic

36 pt 5A 8a 4-1 Lower case alphabet 403 pts. Characters per pica .85

SOME KNIGHTS OF
After an apprentice is

30 pt. 5A 10a 5-1 Lower case alphabet 346 pts. Characters per pica .99

JADE COLOR VARIES
It shows civilization at a

Bodoni Book

42 pt. 4A 9a 4-1

THE Xylophone was

36 pt. 5A 10a 5-1 Lower case alphabet 353 pts. Characters per pica .97

KNIGHTS of the middle

Bodoni Book Italic

36 pt 5A 10a 5-1 Lower case alphabet 350 pts. Characters per pica .98

KNIGHTS of the middle

30 pt 6A 12a 5-1 Lower case alphabet 294 pts. Characters per pica 1 1

JADE CHANGES color from

24 pt. 8A 15a 7-1 Lower case alphabet 240 pts. Characters per pica 1.4

BRAZIL AND other countries were

Ultra Bodoni Extra Condensed

36 pt. 5A 9a 5-1 Lower case alphabet 406 pts. Characters per pica .84

ALL KNIGHTS OF THE
After he serves as an
apprentice, a squire is

Ultra Bodoni

36 pt. 3A 5a 3-1 Lower case alphabet 610 pts Characters per pica .56



30 pt. 4A 7a 4 1 Lower case alphabet 499 pts. Characters per pica .69



Ultra Bodoni Italic

30 pt 5A 11a 5-1 Lower case alphabet 344 pts Characters per pica 1.0



24 pt. 4A 8a 4-1 Lower case alphabet 404 pts. Characters per pica .85



Bernhard Modern Roman

36 pt 5A 10a 4-1 Lower case alphabet 371 pts. Characters per pica .92

ALL KNIGHTS DID
After an apprentice has

30 pt. 5A 12a 5-1 Lower case alphabet 309 pts. Characters per pica 1 1

JADE GREEN IS IN THE
It is used for jewelry or often

Bernhard Modern Italic

30 pt. 5A 12a 4-1 Lower case alphabet 290 pts Characters per pica 1.2

JADE COLOR HAS THE
It is used for jewelry or carved
for ornamental purposes and

24 pt. 6A 15a 5-1 Lower case alphabet 242 pts. Characters per pica 1.4

IN BRAZIL AND ANOTHER
It shows civilization at a time so
remote that it is doubtful whether

Bernhard Modern Bold

36 pt 4A 9a 4-1 Lower case alphabet 415 pts. Characters per pica .82

ALL KNIGHTS OF
After all apprentices

30 pt 4A 7a 3-1 Lower case alphabet 489 pts. Characters per pica .7

JADE COLOR VARIES
It is used for jewelry or is

Bernhard Modern Bold Italic

30 pt 5A 10a 4-1 Lower case alphabet 319 pts. Characters per pica 1 1

JADE COLOR HAS ITS
It is used with jewelry or carved for ornamental and

24 pt 6A 13a 5-1 Lower case alphabet 269 pts Characters per pica 1.3

ARGENTINA AND OTHER
It shows civilization at a time so remote that it is doubtful it was

Onyx

72 pt. 5A 6a 5-1

The First Printer

60 pt. 5A 9a 4-1

Twelve Useful Sizes

Engravers Bold

12 pt. No 3 7A 7-1

BOLD MINER
DRIVE WEST

12 pt No. 2 8A 8-1

IDEAL FRIENDS
MODERN PRICE

Engravers Roman

12 pt No 43 7A 8-1

FILES REPORT

12 pt No 42 8A 10-1

EXCELLENT MENU

12 pt. No. 41 11A 12-1

INVESTMENT ANALYSIS
MATHEMATICAL GRADE

Engravers Shaded

18 pt No. 1 3A 4-1

MINDED

18 pt. No. 2 3A 4-1

REPAYED

12 pt. No. 1 6A 5-1

PREPARED

Card Light Litho

12 pt. No. 4 11A 9-1

CONGRATULATE

12 pt. No. 3 13A 10-1

PICTURE SUBJECTS

12 pt. No. 2 15A 11-1

LOW TEMPERATURES

Typo Roman

24 pt No 1 10A 18a 9-1 Lower case alphabet 193 pts Characters per pica 1 7

Metropolitan Securities Company
Independent Organization

24 pt No 2 11A 21a 10-1 Lower case alphabet 171 pts Characters per pica 2 0

Engravings Satisfactorily Reproduced
Unabridged Encyclopedia

Verona

30 pt. 5A 11a 7-1 Lower case alphabet 304 pts Characters per pica 1 1

JADES CHANGE COLOR
It is used for jewelry or can
be carved into ornaments and

24 pt 7A 15a 8-1 Lower case alphabet 230 pts Characters per pica 1.5

BRAZIL, PERU AND OTHER
It showed civilization at a time when
it was hardly conceivable that nations

Engravers Text

24 pt. No. 1 9A 17a 8-1 Lower case alphabet 219 pts. Characters per pica 1.5

Southern Progressive Association
Noted Speakers Introduced

Wedding Text

48 pt. 4A 9a 4-1

Lower case alphabet 190 pts.
24 pt. No. 2 8A 20a 9-1 Characters per pica 1.8

Gold Rings

Announcement
Big Social Gathering

Engravers Old English

Sponsoring Fall Exhibition
Astonishing Experiment

18 pt. 9A 20a 9-1 Lower case alphabet 209 pts. Characters per pica 1.6

Arts Display of Fine Printing
Skillful Arrangement of Type

Cloister Black

24 pt. 5A 15a 7-1 Lower case alphabet 253 pts Characters per pica 1.3

Noted American Weaver
Original Tapestry
Wonderful Specimen

18 pt. 7A 22a 8-1 Lower case alphabet 202 pts. Characters per pica 1.7

Importing and Exporting Company
Exquisite Jewelry of Unknown Origin

American Typewriter...

Series Number 11 10 pt. 20A 31a 9-1

Imitation typewritten letters have come to occupy an
place in the industrial world of today. It is a wise
who uses facsimile letters to promote his own busines
ABCDEFGHIJKLMNOPQRSTUVWXYZ&abcdefghijklmnopqrstuvwxyz
$1234567890.,-'":;!?()_*@¢/%#

Elite Underwood Typewriter...

Series Number 205 10 pt 20A 31a 9-1

Imitation typewritten letters have come to occupy an
place in the industrial world of today. It is a wise
who uses facsimile letters to promote his own busines
ABCDEFGHIJKLMNOPQRSTUVWXYZ&abcdefghijklmnopqrstuvwxyz
$1234567890.,-'":;!?(_-°+*§@¢/%#

Remington Typewriter No. 2...

Series Number 297 12 pt. 14A 26a 9-1

Imitation typewritten letters have come to oc
place in the industrial world of today. It is
who uses facsimile letters to promote his own
ABCDEFGHIJKLMNOPQRSTUVWXYZ&abcdefghijklmnopqr
$1234567890.,,-'":;!?()_/%#

NOTE: Use JUSTIFIERS instead of regular spaces with
Justifiers will space words in such a manner that the
positioned one above the other, thereby maintaining t
written copy. To achieve this, they must be exactly t
thickness as typewriter characters. When ordering, se
type for which justifiers are required. Prices are th
for other spaces.

Typewriter faces are fonted to the same schemes as ot
position of facsimile typewritten letters, extra font
be ordered.

Heritage

24 pt. 8A 16a 9-1 Lower case alphabet 204 pts. Characters per pica 1.7

Brazil and Other Countries were showing Civilization at a time so remote that they

18 pt. 11A 26a 12-1 Lower case alphabet 154 pts. Characters per pica 2.2

An Invitation is most cordially extended to the Printers and Other Persons interested in visiting the Typographic Library and Museum, which was established to honor and perpetuate the memories and deeds of the great men who

Civilite

24 pt. 5A 24a 11-1 Lower case alphabet 165 pts. Characters per pica 2.1

Brazil and Other Countries Were exporting to Portugal pottery impregnated With a delicate and fragrant perfume. Europe had a constant market

18 pt. 7A 38a 15-1 Lower case alphabet 129 pts. Characters per pica 2.7

An Invitation is most cordially extended to Printers and Other Persons interested in the Typographic Library and Museum, Which Was established to honor and perpetuate the memory and deeds

14 pt. 12A 54a 19-1 Lower case alphabet 103 pts. Characters per pica 3.3

An Invitation is cordially extended to Printers and Other Persons interested in visiting the Typographic Library and Museum, Which Was established to honor and perpetuate the memories and deeds of the great men Who Were the founders

Thompson Quillscript

30 pt 5A 17a 6-1 Lower case alphabet 224 pts Characters per pica 1 5

Cultivate above all things a taste for go reading. There is no pleasure so cheap,

24 pt 7A 21a 7-1 Lower case alphabet 182 pts Characters per pica 1 9

The most influential product of the printing art books. There were countless books written before

Lydian Cursive

30 pt 5A 12a 4-1 Lower case alphabet 284 pts Characters per pica 1 2

Jade is used for Jewelry or can be hand carved for ornamental and decorative purposes. It has

Bank Script

36 pt 3A 11a 5-1 Lower case alphabet 313 pts. Characters per pica 1.1

History Making Events

24 pt. 5A 15a 7-1 Lower case alphabet 244 pts. Characters per pica 1 4

Complete Advertising Material

18 pt. 7A 24a 9-1 Lower case alphabet 187 pts. Characters per pica 1.8

The Flower Show was a Magnificent Affair

Commercial Script

30 pt. 5A 11a 7-1 Lower case alphabet 319 pts. Characters per pica 1.1

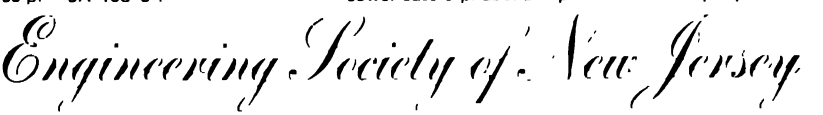


24 pt 6A 14a 8-1 Lower case alphabet 267 pts. Characters per pica 1 3



Typo Script

36 pt 5A 16a 8 1 Lower case alphabet 224 pts Characters per pica 1.5

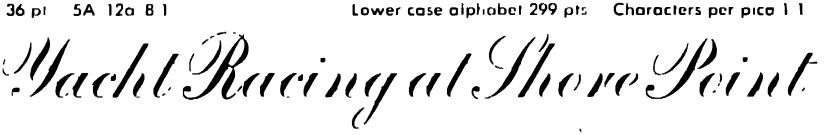


30 pt 6A 20a 9 1 Lower case alphabet 194 pts Characters per pica 1 8

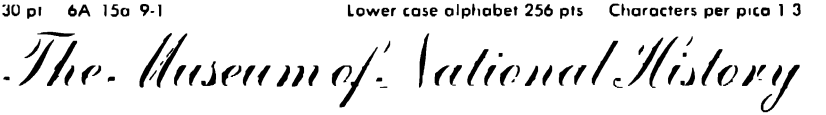


Typo Script Extended

36 pt 5A 12a 8 1 Lower case alphabet 299 pts Characters per pica 1 1

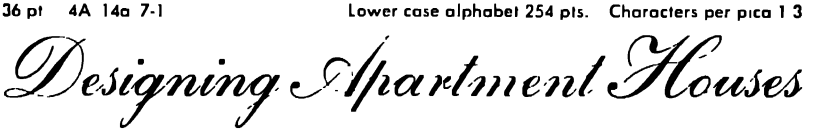


30 pt 6A 15a 9-1 Lower case alphabet 256 pts Characters per pica 1 3

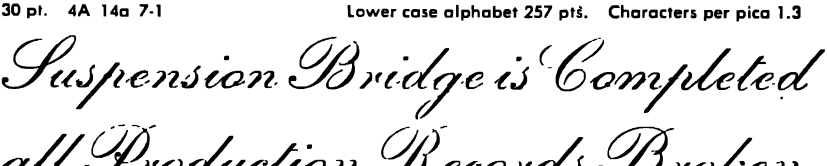


Royal Script

36 pt 4A 14a 7-1 Lower case alphabet 254 pts. Characters per pica 1 3



30 pt. 4A 14a 7-1 Lower case alphabet 257 pts. Characters per pica 1.3



Typo Upright

30 pt 6A 16a 9-1 Lower case alphabet 214 pts Characters per pica 1.6

The Twentieth Wedding Anniversary

24 pt. 8A 20a 11-1 Lower case alphabet 177 pts Characters per pica 1.9

Brazil and Other Countries were exporting to Portugal pottery impregnated with delicate and

Piranesi Italic

36 pt 4A 12a 5-1 Lower case alphabet 276 pts Characters per pica 1.2

Knights of the Middle Ages

30 pt 4A 15a 7-1 Lower case alphabet 229 pts Characters per pica 1.5

Jade Jewelry is Hand Carved by the

Piranesi Bold Italic

30 pt 4A 12a 5-1 Lower case alphabet 277 pts Characters per pica 1.2

Jade Jewelry was Carved by

24 pt. 4A 15a 5-1 Lower case alphabet 230 pts. Characters per pica 1.5

Paintings of Famous Artists from

Bernhard Tango

48 pt. 3A 9a 3-1

Handsome Fashions

36 pt. 5A 12a 4-1 Lower case alphabet 319 pts. Characters per pica 1.1

Swiss Mountaineers climb

Liberty

42 pt. 4A 13a 7-1

Tenth Anniversary Dance

36 pt. 4A 16a 8-1 Lower case alphabet 242 pts. Characters per pica 1.4

National Bank of Milltown

Park Avenue

36 pt. 3A 11a 5-1 Lower case alphabet 303 pts. Characters per pica 1.1

All Knights of the middle

30 pt. 4A 13a 7-1 Lower case alphabet 259 pts Characters per pica 1 3

Jade varies in color from whitish

Raleigh Cursive

30 pt. 4A 14a 7-1 Lower case alphabet 234 pts Characters per pica 1.4

Noted Teacher is Visiting School

24 pt. 5A 16a 8-1 Lower case alphabet 193 pts. Characters per pica 1.8

Exhibition of Rare Antique Bronzes and

Grayda

30 pt. 5A 16a 5-1 Lower case alphabet 213 pts. Characters per pica 1.6

Jade is used for Jewelry or hand Carved for Ornamental or Decorative purposes. It varies in color from Whitish to Dark

Kaufmann Script

30 pt. 7A 13a 7-1 Lower case alphabet 278 pts. Characters per pica 1.2

Jade is used for Jewelry or hand

24 pt. 8A 16a 8-1 Lower case alphabet 227 pts. Characters per pica 1.5

Brazil and Other Countries export to

Kaufmann Bold

30 pt. 6A 12a 5-1 Lower case alphabet 304 pts. Characters per pica 1.1

Jade is used for Jewelry and Carved for an Ornamental or

Brush

36 pt. 4A 10a 4-1 Lower case alphabet 355 pts. Characters per pica .96

All Knights of England

Brody

30 pt. 7A 14a 7-1 Lower case alphabet 260 pts. Characters per pica 1.3

Jade is used for Jewelry or can be Hand Carved for Ornamental

Repro Script

30 pt. 7A 19a 7-1 Lower case alphabet 189 pts. Characters per pica 1.8

Jade is used for Jewelry or can be Carved for Ornamental or Decorative purposes. It

Appendix III

LINOTYPE FACES

Slug Composing and Casting

by

Mergenthaler Linotype Company

36 POINT CALEDONIA BOLD

ABCDEFGHIJKLMNOP
QRSTUVWXYZ&
abcdefghijklmnopqrstuvw
xyz 1234567890,.:;-"?!–()
1234567890
EVERY PART IN THE LI
NOTYPE IS THERE BE
CAUSE THE MACHINE
Modern man cannot be ser-
ved by a tool that is just good
enough or a little better than
pretty good. The good tool
must do all that man can de-

24 POINT CALEDONIA WITH ITALIC

ABCDEFGHIJKLMNOPQRST
ABCDEFGHIJKLMNOPQRST
UVWXYZ& 1 1 2⅛3¼
UVWXYZ& *1 1* 2⅛3¼

Alternate Figures, Special No 1, .166

abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
1234567890$,.:;'-'?!–() 1234567890
1234567890$,.:;'-'?!–() *1234567890*
⅛¼⅜½⅝¾⅞⅓⅔⅕⅖⅗⅘⅙⅚
⅛¼⅜½⅝¾⅞⅓⅔⅕⅖⅗⅘⅙⅚

EVERY PART IN THE LINOTYPE
IS THERE BECAUSE THE MACHI

Modern man cannot be served by a to ol that is just good enough or a little better than pretty good. The good to

Modern man cannot be served by a to ol that is just good enough or a little

36 POINT METROMEDIUM NO. 2 ITALIC

ABCDEFGHIJKLMNOP
QRSTUVWXYZ&
aabcdefghijklmnopqrst
uvwxyz
1234567890$,.:;-"?!()
%¼½¾⅓⅔
EVERY PART IN THE LIN
OTYPE IS THERE BECAU
SE THE MACHINE IS BET

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool

14 POINT ELECTRA WITH ITALIC AND SMALL CAPS

ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
abcdefghijklmnopqrstuvwxyzæœfiflffffiffl
abcdefghijklmnopqrstuvwxyzæœfiflffffiffl
1234567890$£,.:;-''?!–|— . . . ()@℔*†‡❲§[]%❧❧
1234567890$£,.:;-''?!–|— . . . ()@℔†‡❲§[]%❧❧*

Special Characters

áàâäçéèêëíìîïñóòôöúùûü
áàâäçéèêëíìîïñóòôöúùûü

Two Letter Combinations

Z&flffiffl(|) . :$*1234567890
UNYWMAIQLSPOVBCDEFGRTJKHXZ&ÆŒ

EVERY PART IN THE LINOTYPE IS THERE *BECAUSE THE MACHINE* IS BETTER FOR IT AND ALL FIT INTO THE BIG SCHEME OF SIMPLE OPERATION. THERE

ARE NO MAKESHIFTS IN THE LINOTYPE. THERE ARE NO COMPROM

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. *He cannot afford to limp behind,* adapting past inventions copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype composition" throughout the world, because all the elements of successful machine composition were created for the Linotype and

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater de-

14 POINT ELECTRA WITH ELECTRA BOLD

ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ

abcdefghijklmnopqrstuvwxyzæœfiflffffiffl
abcdefghijklmnopqrstuvwxyzæœfiflffffiffl

1234567890$£,.:;-''?!–|— . . . ()*†‡¶[§[]%
1234567890$£,.:;-''?!– — . . . ()*†‡¶[§[]%

⅛¼⅜½⅝¾⅞ 1/8 1/4 3/8 1/2 5/8 3/4 7/8
⅛¼⅜½⅝¾⅞ 1/8 1/4 3/8 1/2 5/8 3/4 7/8

Special Characters

áàâäçéèêëîìïñóòôöúùûü
áàâäçéèêëîìïñóòôöúùûü

EVERY PART IN THE LINOTYPE IS THERE BECAUSE THE MACHINE IS BETTER FOR IT AND ALL FIT INTO THE BIG SCHEME OF SIMPLE OPERATION. THERE AR

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype composi-

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype composi-

12 POINT ELDORADO WITH ITALIC AND SMALL CAPS

ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
abcdefghijklmnopqrstuvwxyzæœfiflffffiffl
abcdefghijklmnopqrstuvwxyzæœfiflffffiffl
1234567890$£,.:;'-'?!-|— . . . ()*†‡¶§[]% 1234567890
1234567890$£,.:;'-'?!-|— . . . ()†‡¶§[]%* 1234567890
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Two-Letter Combinations

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Special Characters

áàâäçéèêëîïíñóòôöúùûüi¡
áàâäçéèêëîïíñóòôöúùûüi¡

Long Descenders

gjpqy
gjpqy

EVERY PART IN THE LINOTYPE IS THERE BECAUSE THE MA
CHINE IS BETTER FOR IT AND ALL FIT INTO THE BIG SCHE

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "*Linotype composition*" throughout the world, because all the elements of successful machine composition were created for

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype composition" *throughout the world, because all the elements of successful machine composition were created for*

14 POINT FAIRFIELD MEDIUM WITH ITALIC AND SMALL CAPS

ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
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Two-Letter Combinations

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Special Characters

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áàâäçéèêëíìîïñóòôöúùûüi¿

Long Descenders

gjpqy
gjpqy

EVERY PART IN THE LINOTYPE IS THERE BECAUSE T
HE MACHINE IS BETTER FOR IT AND ALL FIT INTO T

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean *"Linotype composi-*

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype composi-

14 POINT FAIRFIELD WITH ITALIC AND SMALL CAPS

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Special Characters

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áàâäçéèêëíìîïñóòôöúùûü

Two-Letter Combinations

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UNYWMAIQLSPOVBCDEFGRTJHLLKXZ&ÆŒ

EVERY PART IN THE LINOTYPE IS THERE *BECAUSE THE MACHINE* IS BETTER FOR IT AND ALL FIT INTO THE BIG SCHEME OF SIMPLE OPERATION. THERE ARE

NO MAKESHIFTS IN THE LINOTYPE. THERE ARE NO COMPROMISES TO

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words

12 POINT PRIMER WITH ITALIC AND SMALL CAPS

ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
ABCDEFGHIJKLMNOPQRSTUVWXYZ&ÆŒ
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Two-Letter Combinations

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UNYWMAIQLPSOVBCDEFGRTJHKXZ&ÆŒ

Special Characters

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áàâäçéèêëîìïñóòôöúùûü¿¡

Long Descenders

gjpqy
gjpqy

EVERY PART IN THE LINOTYPE IS THERE BECAUSE THE *MACHINE IS BETTER FOR IT AND ALL FIT INTO THE BIG*

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "*Linotype composi-*

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype composi-

14 POINT JANSON WITH ITALIC AND SMALL CAPS

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℅ 1/8 1/4 3/8 1/2 5/8 3/4 7/8 1/8 1/4 3/8 1/2 5/8 3/4 7/8

Special Characters

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áàâäçéèêëíìîïñóòôöúùûü¿¡
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fafefofrfuffaffeffoffrffu
FA PA TA VA WA YA Va Ve Vo Ya Ye Yo Wa We Wo Th Wh

Two-Letter Combinations

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UNYWMAIQLSPOVBCDEFGRTJHKXZ&ÆŒ

EVERY *PART* IN THE LINOTYPE IS THERE *BECAUSE* THE MACHINE IS BETTER FOR IT AND ALL FIT INTO THE BIG SCHEME OF SIMPLE OPERATION. THERE A

RE NO MAKESHIFTS IN THE LINOTYPE. THERE ARE NO COMPROMISE

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype compo-

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands

14 POINT MONTICELLO WITH ITALIC
[Reg U S Pat Off.]
AND SMALL CAPS

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Two-Letter Combinations

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UNYWMAIQPSOVBCDEFGRTJHKLXZ&ÆŒ

Special Characters

áàâäçéèêëîìïñóòôöúùûü¿¡
áàâäçéèêëîìïñóòôöúùûü¿¡

Long Descenders

gjpqy
gjpqy

EVERY PART IN THE LINOTYPE IS THERE BECAUSE
THE MACHINE IS BETTER FOR IT AND ALL FIT INT

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "*Linotype composi-*

Modern man cannot be served by a tool that is just good enough or a little better than pretty good. The good tool must do all that man can demand today and it must be able to meet his greater demands of tomorrow. The maker of a great tool is a prophet of industry. He cannot afford to limp behind, adapting past inventions, copying here, borrowing there, evading or omitting where he dares not borrow. The words "machine composition" mean "Linotype composi-

Appendix IV

INTERTYPE FACES

Slug Composing and Casting

by

Intertype Company

A Division of Harris-Intertype Corporation

INTERTYPE faces are made on modern wide tooth matrices whi

18 Pt. Alternate Gothic No 1. Characters to 1 pica 2/31

INTERTYPE faces are made on modern wide tooth matrices wh

18 Pt Vogue Bold Condensed. Characters to 1 pica 2.23

INTERTYPE faces are made on modern

18 Pt Antique No. 1 Characters to 1 pica 1 5

INTERTYPE faces are made on modern

18 Pt. Antique No. 1 Italic. Characters to 1 pica 1 5

INTERTYPE faces are made on modern wide toot

18 Pt Baskerville Characters to 1 pica 1 8

INTERTYPE faces are made on modern wide too

18 Pt. Baskerville Italic. Characters to 1 pica 1 8

Intertype faces are made on modern wide tooth matrices

18 Pt Bernhard Fashion Characters to 1 pica 2 03

INTERTYPE faces are made on modern w

18 Pt. Beton Bold. Characters to 1 pica 1 46

INTERTYPE faces are made on mo

18 Pt Beton Extra Bold. Characters to 1 pica 1 21

INTERTYPE FACES ARE MADE ON MODERN

16 Pt. Titling Condensed.

INTERTYPE faces are made on mo

18 Pt. Beton Wide. Characters to 1 pica 1.22

INTERTYPE faces are made on mo

18 Pt Franklin Gothic. Characters to 1 pica 1.22

INTERTYPE faces are made on modern wide

18 Pt. Beton Medium. Characters to 1 pica 1.48

INTERTYPE faces are made on modern wide

18 Pt. Bodoni. Characters to 1 pica 1 64

INTERTYPE faces are made on modern wide

18 Pt. Bodoni Italic. Characters to 1 pica 1 66

INTERTYPE faces are made on modern wi

18 Pt Bodoni Bold Italic Characters to 1 pica 1.52

INTERTYPE faces are made on modern wi

18 Pt. Bodoni Bold. Characters to 1 pica 1 53

INTERTYPE faces are made on modern wide tooth mat

18 Pt Bodoni Bold Condensed Characters to 1 pica 1 93

INTERTYPE faces are made on

18 Pt Bodoni Modern Characters to 1 pica 1.17

INTERTYPE faces are made on

18 Pt Bodoni Modern Italic. Characters to 1 pica 1.15

INTERTYPE FACES A

18 Pt Bold Face No 9

INTERTYPE FACES ARE M

18 Pt. Bold Face No 9a

INTERTYPE faces are made on moder

18 Pt. Bookface. Characters to 1 pica 1 45

INTERTYPE faces are made on mode

18 Pt. Bookface Italic. Characters to 1 pica 1.44

INTERTYPE faces are made on modern

18 Pt. Cairo. Characters to 1 pica 1.46

INTERTYPE faces are made on modern

18 Pt. Cairo Italic. Characters to 1 pica 1.45

INTERTYPE faces are made on modern

18 Pt. Cairo Medium. Characters to 1 pica 1 44

INTERTYPE faces are made on modern

18 Pt. Cairo Medium Italic. Characters to 1 pica 1 44

INTERTYPE faces are made on modern wide too

18 Pt. Cairo Medium Condensed. Characters to 1 pica 1 7

INTERTYPE faces are made on modern

18 Pt. Cairo Bold Characters to 1 pica 1 44

INTERTYPE faces are made on modern

18 Pt. Cairo Bold Italic. Characters to 1 pica 1 4

INTERTYPE faces are made on modern wide too

18 Pt. Cairo Bold Condensed. Characters to 1 pica 1 7

INTERTYPE faces are made on modern

18 Pt. Corinna. Characters to 1 pica 1 46

INTERTYPE faces are made on modern wide too

18 Pt. Cairo Extra Bold Condensed. Characters to 1 pica 1 7

INTERTYPE faces are made on modern

18 Pt. Cairo Heavy Characters to 1 pica 1 41

INTERTYPE faces are made on moder

18 Pt. Caslon Italic. Characters to 1 pica 1 43

INTERTYPE faces are made on moder

18 Pt. Caslon Characters to 1 pica 1.43

INTERTYPE faces are made on modern wi

18 Pt. Caslon No. 4. Characters to 1 pica 1.53

INTERTYPE faces are made on mo

18 Pt. Caslon No 3. Characters to 1 pica 1 27

INTERTYPE faces are made on

18 Pt. Caslon No 3 Italic. Characters to 1 pica 1 26

INTERTYPE faces are made on modern

18 Pt Century Expanded Characters to 1 pica 1 5

INTERTYPE faces are made on modern

18 Pt Century Bold Characters to 1 pica 1 55

INTERTYPE faces are made on mod

18 Pt Century Bold Italic Characters to 1 pica 1 36

INTERTYPE faces are made on modern wide tooth ma

18 Pt Century Bold Condensed Characters to 1 pica 1 94

INTERTYPE faces are made on modern wi

18 Pt Century Bold Condensed Italic Characters to 1 pica 1 53

INTERTYPE faces are made on modern wide to

18 Pt Cheltonian Characters to 1 pica 1 81

INTERTYPE faces are made on modern wide to

18 Pt. Cheltonian Italic Characters to 1 pica 1 8

INTERTYPE faces are made on modern wide toot

18 Pt Cheltonian Condensed. Characters to 1 pica 1 81

Intertype faces are made on modern wide tooth matrices whic

18 Pt Lotus Characters to 1 pica 2 24

INTERTYPE faces are made on modern wi

18 Pt. Cheltonian Wide. Characters to 1 pica 1.6

INTERTYPE faces are made on modern wid

18 Pt. Cheltonian Medium. Characters to 1 pica 1 6

INTERTYPE faces are made on modern wid

18 Pt. Cheltonian Medium Italic. Characters to 1 pica 1 6

INTERTYPE faces are made on modern wide tooth

18 Pt Cheltonian Medium Condensed Characters to 1 pica 1 88

INTERTYPE faces are made on modern

18 Pt Cheltonian Bold. Characters to 1 pica 1 51

INTERTYPE faces are made on moder

18 Pt Cheltonian Bold Italic Characters to 1 pica 1 4

INTERTYPE FACES ARE

18 Pt. De Luxe Gothic Medium

INTERTYPE faces are made on modern wide tooth.

18 Pt. Cheltonian Bold Condenseo. Characters to 1 pica 1.81

INTERTYPE faces are made on modern wide too

18 Pt. Cheltonian Bold Condensed Italic Characters to 1 pica 1 75

INTERTYPE faces are made on modern wide tooth matrices

18 Pt Cheltonian Bold Extra Condensed Characters to 1 pica 2.21

INTERTYPE faces are made on modern wide tooth

18 Pt. Cloister Old Style. Characters to 1 pica 1 96

INTERTYPE faces are made on modern wide tooth

18 Pt. Cloister Old Style Italic. Characters to 1 pica 1.94

INTERTYPE faces are made on modern wide to

18 Pt. Cloister Bold Characters to 1 pica 1.74

INTERTYPE faces are made on modern wide to

18 Pt. Cloister Bold Italic. Characters to 1 pica 1 88

INTERTYPE faces are made on modern wide to

18 Pt. Cloister Bold Tooled Characters to 1 pica 1.77

INTERTYPE FACES ARE MAD

18 Pt De Luxe Gothic Medium A.

INTERTYPE faces are made on mo

18 Pt. Eatonian Gothic. Characters to 1 pica 1.29

INTERTYPE faces are made on modern wide t

18 Pt Egmont Light. Characters to 1 pica 1 73

INTERTYPE faces are made on modern wide t

18 Pt Egmont Light Italic. Characters to 1 pica 1 73

INTERTYPE faces are made on modern w

18 Pt Egmont Medium Characters to 1 pica 1 51

INTERTYPE faces are made on modern w

18 Pt Egmont Medium Italic. Characters to 1 pica 1.51

INTERTYPE faces are made on modern wide tooth

18 Pt. Parisian Characters to 1 pica 2 05

INTERTYPE FACES ARE MADE ON MODE

20 Pt Runic

INTERTYPE faces are made on modern w

18 Pt Egmont Bold. Characters to 1 pica 1 51

INTERTYPE faces are made on modern w

18 Pt. Egmont Bold Italic. Characters to 1 pica 1.51

Intertype faces are made on modern wide too

18 Pt. Engravers Old English. Characters to 1 pica 1 66

INTERTYPE faces are made on mo

18 Pt. Franklin Gothic Characters to 1 pica 1 21

INTERTYPE faces are made on modern wide t

18 Pt. Futura Medium. Characters to 1 pica 1.62

INTERTYPE faces are made on modern wide

18 Pt. Futura Medium Oblique — Characters to 1 pica 1 61

INTERTYPE faces are made on modern wid

18 Pt. Futura Demibold. — Characters to 1 pica 1 52

INTERTYPE faces are made on modern wid

18 Pt. Futura Demibold Oblique. — Characters to 1 pica 1 52

INTERTYPE faces are made on modern wide tooth matrices which gi

18 Pt Latin Condensed. — Characters to 1 pica 2 56

INTERTYPE faces are made on modern wid

18 Pt. Futura Book No 2 — Characters to 1 pica 1 54

INTERTYPE faces are made on modern w

18 Pt Futura Bold. — Characters to 1 pica 1 41

INTERTYPE faces are made on modern

18 Pt Futura Bold Oblique. — Characters to 1 pica 1.37

INTERTYPE faces are made on modern wide tooth mat

18 Pt Futura Bold Condensed — Characters to 1 pica 1 9

INTERTYPE faces are made on modern wide tooth mat

18 Pt. Futura Medium Condensed No 2 — Characters to 1 pica 1 9

INTERTYPE faces are made on modern wide too

18 Pt Garamond — Characters to 1 pica 1 77

INTERTYPE faces are made on modern wide tooth m

18 Pt Garamond Italic — Characters to 1 pica 2

INTERTYPE faces are made on modern wid

18 Pt. Garamond Bold. — Characters to 1 pica 1.61

INTERTYPE faces are made on modern wide to

18 Pt. Garamond Bold Italic. — Characters to 1 pica 1.73

INTERTYPE faces are made on modern wide tooth m

18 Pt Gothic Condensed No 1. Characters to 1 pica 2 03

INTERTYPE faces are made on modern wide tooth matrices which

18 Pt Gothic Condensed No 2. Characters to 1 pica 2 47

INTERTYPE faces are made on modern wide tooth m

18 Pt Gothic No 13 Characters to 1 pica 1 91

INTERTYPE faces are made on modern wide tooth matrices which give lon

18 Pt Gothic No 14. Characters to 1 pica 2 73

INTERTYPE FACES ARE MADE ON MO

18 Pt Gothic No 30A.

INTERTYPE FACES ARE M

18 Pt Gothic No 31.

INTERTYPE faces are made on

18 Pt Gothic Wide Bold Face Characters to 1 pica 1.14

INTERTYPE faces are made on modern

18 Pt Goudy Bold. Characters to 1 pica 1.47

INTERTYPE faces are made on modern

18 Pt Goudy Bold Italic. Characters to 1 pica 1.52

INTERTYPE faces are made on modern wide tooth

18 Pt. Kenntonian. Characters to 1 pica 1.9

INTERTYPE faces are made on modern wide tooth

18 Pt Kenntonian Italic. Characters to 1 pica 2.01

INTERTYPE FACES ARE MADE ON MODERN WIDE TOOTH

18 Pt. Latin Condensed No 2

INTERTYPE faces are made on modern wide too

18 Pt Lydian Characters to 1 pica 1 67

INTERTYPE faces are made on modern wide too

18 Pt Lydian Italic — Characters to 1 pica 1 67

INTERTYPE faces are made on modern wide t

18 Pt Lydian Bold — Characters to 1 pica 1 62

INTERTYPE faces are made on modern wide t

18 Pt Lydian Bold Italic — Characters to 1 pica 1 62

INTERTYPE faces are made on modern wi

18 Pt Medieval — Characters to 1 pica 1 54

INTERTYPE faces are made on modern

18 Pt Medieval Bold — Characters to 1 pica 1 54

Intertype faces are made on modern wide tooth matrices whic

18 Pt Minuet — Characters to 1 pica 2 24

Intertype faces are made on modern wide tooth matrices which give

18 Pt. Nova Script — Characters to 1 pica 2 4

INTERTYPE faces are made on modern wide tooth matrices whi

18 Pt Palisade — Characters to 1 pica 2 28

Intertype faces are made on modern wide tooth matri

18 Pt Park Avenue — Characters to 1 pica 2 03

INTERTYPE faces are made on modern wide tooth

18 Pt Rivoli — Characters to 1 pica 2 05

INTERTYPE faces are made on modern

18 Pt. Rugged Black. — Characters to 1 pica 1.39

INTERTYPE faces are made on modern wide

18 Pt. Vogue — Characters to 1 pica 1 67

INTERTYPE faces are made on modern wide

18 Pt. Vogue Oblique. — Characters to 1 pica 1 67

INTERTYPE faces are made on modern wide

18 Pt. Vogue Bold — Characters to 1 pica 1.66

INTERTYPE faces are made on modern wide tooth matrices w

18 Pt Vogue Condensed. — Characters to 1 pica 2 31

INTERTYPE faces are made on modern wid

18 Pt Vogue Bold Oblique — Characters to 1 pica 1 6

INTERTYPE faces are made on modern wide tooth matrices wh

18 Pt Vogue Bold Condensed — Characters to 1 pica 2 25

INTERTYPE faces are made on modern wide tooth matrice

18 Pt. Vogue Extra Bold Condensed. — Characters to 1 pica 2 11

INTERTYPE faces are made on modern

18 Pt Vogue Extra Bold — Characters to 1 pica 1 47

INTERTYPE faces are made on modern

18 Pt Vogue Extra Bold Oblique — Characters to 1 pica 1 45

INTERTYPE faces are made on modern wide tooth matrice

18 Pt Vogue Medium Condensed — Characters to 1 pica 2 08

INTERTYPE faces are made on modern wide tooth matrice

18 Pt Vogue Extra Bold Condensed — Characters to 1 pica 2.11

INTERTYPE faces are made on modern wide tooth matri

18 Pt Vogue Extra Bold Condensed with Oblique — Characters to 1 pica 1 98

INTERTYPE faces are made on modern wide to

18 Pt Weiss — Characters to 1 pica 1 69

INTERTYPE faces are made on modern wide toot

18 Pt Weiss Italic — Characters to 1 pica 1 79

INTERTYPE faces are made on modern wide tooth m

20 Pt Gothic No 5. — Characters to 1 pica 1 97

Appendix V

LUDLOW TYPE FACES

Hand Set and Machine Cast

by

Ludlow Typograph Company

Admiral Script 26

Ludlow 49-BIC Admiral Script 14 to 48 point

Artcraft 19

Ludlow 10-L Artcraft 10 to 48 point

Artcraft Italic 82

Ludlow 10-LI Artcraft Italic 10 to 48 point

Artcraft Bold 37

Ludlow 10-B Artcraft Bold 6 to 48 point

Bodoni 64

Ludlow 3-L Bodoni 12 to 42 point

Bodoni Italic 50

Ludlow 3-LI Bodoni Italic 12 to 48 point

Bodoni Modern 29

Ludlow 3-M Bodoni Modern 6 to 72 point

Bodoni Modern Italic 45

Ludlow 3-MI Bodoni Modern Italic 6 to 72 point

Bodoni Bold 75

Ludlow 3-B Bodoni Bold 6 to 72 point

Bodoni Bold Italic 36

Ludlow 3-BI Bodoni Bold Italic 6 to 72 point

Bodoni Bold Condensed 42

Ludlow 3-BC Bodoni Bold Condensed 14 to 72 point

Bodoni Campanile 31

Ludlow 3-BEC Bodoni Campanile 14 to 72 point, also 96 point caps

Bodoni Campanile Italic 98

Ludlow 3-BECI Bodoni Campanile Italic 18 to 48 point

Bodoni Black 82

Ludlow 3-H Bodoni Black 6 to 72 point

Bodoni Black Italic

Ludlow 3-HI Bodoni Black Italic 12 to 72 point

Bookman 19

Ludlow 14-L Bookman 12 to 48 point

Bookman Italic 82

Ludlow 14-LI Bookman Italic 12 to 48 point

Cameo 76

Ludlow No. 19 Cameo 12 to 72 point

Cameo Italic 43

Ludlow No 19-I Cameo Italic 12 to 48 point

Caslon Light 59

Ludlow 1-L Caslon Light 4 to 72 point

Caslon Light Italic 12

Ludlow 1-LI Caslon Light Italic 6 to 72 point

Caslon Bold 73

Ludlow 1-B Caslon Bold 6 to 72 point

Caslon Bold Italic 49

Ludlow 1-BI Caslon Bold Italic 6 to 48 point

Caslon Bold Condensed 16

Ludlow 1-BC Caslon Bold Condensed 6 to 72 point

Caslon Bold Extra Condensed 95

Ludlow 1-BEC Caslon Bold Extra Condensed 12 to 72 point

Caslon Old Face Heavy

Ludlow 1-OFH Caslon Old Face Heavy 6 to 48 point

Caslon Heavy Italic

Ludlow 1-HI Caslon Heavy Italic 14 to 48 point

True-Cut Caslon 65

Ludlow 1-TC True-Cut Caslon 8 to 72 point

True-Cut Caslon Italic 34

Ludlow 1-TCI True-Cut Caslon Italic 8 to 72 point

Century Bold 82

Ludlow 5-B Century Bold 12 to 72 point

Century Bold Italic 28

Ludlow 5-BI Century Bold Italic 12 to 72 point

Century Expanded 16

Ludlow 5-E Century Expanded 12 to 42 point

Century Bold Ext.

Ludlow 5-BE Century Bold Extended 12 to 60 point

Cheltenham Oldstyle 57

Ludlow 2-L Cheltenham Oldstyle 12 to 48 point

Cheltenham Oldstyle Condensed

Ludlow 2-LC Cheltenham Oldstyle Condensed 12 to 48 point

Cheltenham Oldstyle Italic

Ludlow 2-LI Cheltenham Oldstyle Italic 12 to 48 point

Cheltenham Cursive 92

Ludlow 2-LIC Cheltenham Cursive 18 to 48 point

Chelt. Med.

Ludlow 2-M Cheltenham Medium 48, 60 and 72 point

Cheltenham Bold 68

Ludlow 2-B Cheltenham Bold 6 to 72 point

Cheltenham Bold Italic

Ludlow 2-BI Cheltenham Bold Italic 6 to 72 point

Cheltenham Bold Condensed 53

Ludlow 2-BC Cheltenham Bold Condensed 6 to 72 point

Cheltenham Bold Cond. Italic

Ludlow 2-BCI Cheltenham Bold Condensed Italic 12 to 72 point

Cheltenham Bold Extra Condensed 42

Ludlow 2-BEC Cheltenham Bold Extra Condensed 12 to 72 point

Cheltenham Wide 39

Ludlow 2-LW Cheltenham Wide 6 to 36 point

Chelt. Bold Ext. 25

Ludlow 2-BE Cheltenham Bold Extended 12 to 48 point

Cheltenham Bold Outline

Ludlow 2-BO Cheltenham Bold Outline 18 to 36 point

Clearface Bold 17

Ludlow 8-B Clearface Bold 18 to 48 point

Clearface Bold Italic 69

Ludlow 8-BI Clearface Bold Italic 14 to 48 point

Coronet 54

Ludlow 42-MIC Coronet 14 to 72 point

Coronet Bold 32

Ludlow 42-BIC Coronet Bold 14 to 72 point

Cushing Antique 90

Ludlow No. 4 Cushing Antique 12 to 42 point

DELPHIAN 28

Ludlow 21-OPT Delphian Open Title 18 to 60 point

Eden Light 78

Ludlow 37-L Eden Light 8 to 72 point

Eden Bold 51

Ludlow 37-B Eden Bold 10 to 72 point

Eusebius 28

Ludlow 40-L Eusebius 6 to 72 point

EUSEBIUS SMALL CAPS 36

Ludlow 40-L Eusebius Small Caps 12, 14, 16 and 18 point

Eusebius Italic 37

Ludlow 40-LI Eusebius Italic 8 to 72 point

Eusebius Bold 10

Ludlow 40-B Eusebius Bold 6 to 72 point

Eusebius Bold Italic 46

Ludlow 40-BI Eusebius Bold Italic 8 to 72 point

Eusebius Open 27

Ludlow 40-OP Eusebius Open 18, 24, 36 and 48 point

Fraktur Medium Bold Condensed 12
Ludlow 16-1MBC Fraktur Medium Bold Condensed 16 to 48 point

Fraktur No. 16-2
Ludlow 16-2B Fraktur Bold 16 to 48 point

Fraktur No. 16-3
Ludlow 16-3B Fraktur Bold 16 to 48 point

Garamond 98
Ludlow 24-L Garamond 6 to 72 point

GARAMOND SMALL CAPS 76
Ludlow 24-L Garamond Small Caps 12, 14, 16 and 18 point

Garamond Italic 10
Ludlow 24-LI Garamond Italic 6 to 72 point

Garamond Bold 54
Ludlow 24-B Garamond Bold 6 to 72 point

Garamond Bold Italic 32
Ludlow 24-BI Garamond Bold Italic 6 to 72 point

Medium Condensed Gothic 52
Ludlow 6-B Medium Condensed Gothic 6 to 72 point
also Deluxe Variants 12 to 72 point

Six Recent Additions to the Ludlow Library of Typefaces

Formal Script
Ludlow 51-MIC Formal Script 14, 18, 24 point

Florentine
Ludlow 52-LIC Florentine 14, 18, 24, 30, 36 point

Gothic Condensed Outline
Ludlow 6-CO Gothic Condensed Outline 18 to 48 point

Record Gothic Extra Condensed
Ludlow 6-REC Record Gothic Extra Condensed 12 to 48 point

Record Gothic Med. Ext.
Ludlow 6-RME Record Gothic Medium Extended 6 to 48 point

Tempo Bold Ext.
Ludlow 28-BE Tempo Bold Extended 18, 24, 36, 48 point

Condensed Gothic 16

Ludlow 6-C Condensed Gothic 6 to 96 point
also Deluxe Variants 12 to 72 point

Condensed Gothic No. 2

Ludlow 6-C2 Condensed Gothic No. 2 18 to 72 point

Square Gothic 29

Ludlow 6-ZB Square Gothic 4 to 48 point

Franklin Gothic 38

Ludlow 6-F Franklin Gothic 6 to 72 point

Franklin Gothic Extra Condensed

Ludlow 6-FEC Franklin Gothic Extra Condensed 12 to 72 point
also 84 and 96 point caps

HEADLINE GOTHIC 62

Ludlow 6-H Headline Gothic 30 to 60 point

CHAMFER GOTHIC 79

Ludlow 6-HP Chamfer Gothic 30 to 48 point

Record Gothic 54

Ludlow 6-R Record Gothic 6 to 36 point

Record Gothic Condensed 32

Ludlow 6-RC Record Gothic Condensed 6 to 48 point

LINING PLATE GOTHIC LT.

Ludlow 6-LPL Lining Plate Gothic Light 6 to 24 point

LINING PLATE GOTHIC LT. COND

Ludlow 6-LPLC Lining Plate Gothic Light Condensed 6 to 18 point

LINING GOTH. LT. EXT.

Ludlow 6-LPLE Lining Plate Gothic Light Extended 6 to 12 point

LINING PLATE GOTH. BOLD

Ludlow 6-LPB Lining Plate Gothic Bold 6 to 24 point

LINING GOTHIC HEAVY 76

Ludlow 6-LPH Lining Plate Gothic Heavy 6 to 24 point

LINING PLATE GOTHIC HY. COND.

Ludlow 6-LPHC Lining Plate Gothic Heavy Condensed 6 to 18 point

LINING GOTH. HY. EXT.

Ludlow 6-LPHE Lining Plate Gothic Heavy Extended 6 to 12 point

COMMERCE GOTHIC LIGHT 35
Ludlow 44-L Commerce Gothic Light 6 to 18 point

COMMERCE GOTHIC LIGHT COND. 49
Ludlow 44-LC Commerce Gothic Light Condensed 6 to 18 point

COMMERCE GOTHIC MEDIUM
Ludlow 44-M Commerce Gothic Medium 6 to 18 point

COMMERCE GOTHIC MEDIUM COND. 58
Ludlow 44-MC Commerce Gothic Medium Condensed 6 to 18 point

ENGRAVERS BOLD 19
Ludlow 17 Engravers Bold 6 to 24 point

LINING LITHO LIGHT 32
Ludlow 45-L Lining Litho Light 6 to 18 point

LINING LITHO BOLD 79
Ludlow 45-B Lining Litho Bold 6 to 18 point

VICTORIA ITALIC 54
Ludlow 18 Victoria Italic 6 to 12 point

Greenwich 28
Ludlow 46-MEC Greenwich 36 to 72 point

Hauser Script 30
Ludlow 38-HIC Hauser Script 18 to 72 point

שריפט 5
Ludlow 29-1L Hebrew Modern 48 to 84 point

גרונט 48
Ludlow 29-2B Hebrew Bold 48 to 84 point

מיט נייע 62
Ludlow 29-3BC Hebrew Bold Condensed 48 to 84 point

Karnak Light 79

Ludlow 30-L Karnak Light 6 to 72 point

Karnak Intermediate 12

Ludlow 30-LM Karnak Intermediate 6 to 72 point

Karnak Inter. Italic 36

Ludlow 30-LMI Karnak Intermediate Italic 8 to 48 point

Karnak Medium 40

Ludlow 30-M Karnak Medium 6 to 72 point

Karnak Medium Italic

Ludlow 30-MI Karnak Medium Italic 8 to 48 point

Karnak Obelisk 95

Ludlow 30-MEC Karnak Obelisk 14 to 72 point

Karnak Black 18

Ludlow 30-H Karnak Black 10 to 72 point

Karnak Black Ital.

Ludlow 30-HI Karnak Black Italic 14 to 72 point

Karnak Black Condensed 72

Ludlow 30-HC Karnak Black Condensed 14 to 72 point
also 120 and 144 point

Karnak Black Cond. Italic 4

Ludlow 30-HCI Karnak Black Condensed Italic 14 to 72 point

Lafayette Extra Condensed 53

Ludlow 35-EC Lafayette Extra Condensed 18 to 48 point

Laureate 32

Ludlow No. 7 Laureate 18 to 36 point

Ludlow Black 90

Ludlow No. 15 Ludlow Black 8 to 48 point

Ludlow Black Ital.

Ludlow 15-I Ludlow Black Italic 12 to 48 point

Ludlow No. 11 Light 28

Ludlow Number 11-L 6 to 48 point

Ludlow No. 11 Light Italic 7

Ludlow Number 11-LI 6 to 48 point

Ludlow No. 11 Bold 64

Ludlow Number 11-B 6 to 72 point

Ludlow No. 11 Bold Italic

Ludlow Number 11-BI 6 to 72 point

Mandate 76

Ludlow 36-BIC Mandate 14 to 72 point

Mayfair Cursive 48

Ludlow 31-MIC Mayfair Cursive 14 to 72 point

Old English 72

Ludlow No 20 Old English 8 to 48 point

Plantin 68

Ludlow 39 L Plantin 6 to 12 point

PLANTIN SMALL CAPS

Ludlow 39-L Plantin Small Caps 6 to 12 point

Plantin Italic 92

Ludlow 39-LI Plantin Italic 6 to 12 point

Powell 30

Ludlow No 9 Powell 14 to 48 point

Radiant Medium 84

Ludlow 43-M Radiant Medium 6 to 72 point

Radiant Medium Italic 75

Ludlow 43 MI Radiant Medium Italic 8 to 48 point

Radiant Bold 62

Ludlow 43-B Radiant Bold 6 to 72 point

Radiant Bold Condensed 49

Ludlow 43-BC Radiant Bold Condensed 12 to 72 point

Radiant Bold Condensed Italic 2

Ludlow 43-BCI Radiant Bold Condensed Italic 18 to 72 point

Radiant Bold Extra Condensed 37

Ludlow 43-BEC Radiant Bold Extra Condensed 14 to 72 point
also 96 point caps

Radiant Heavy 46

Ludlow 43-H Radiant Heavy 10 to 72 point

Samson 50

Ludlow 47-H Samson 24, 36, 48 and 72 point

Society Text 57

Ludlow 50 Society Text 8 to 36 point including 16 and 21 point

Stellar 91

Ludlow 27-L Stellar 8 to 72 point

Stellar Bold 82

Ludlow 27-B Stellar Bold 8 to 72 point

STENC.

Ludlow 41 Stencil 36 point

Stygian Black 73

Ludlow No 25 Stygian Black 14 to 48 point

Stygian Black Italic

Ludlow 25-I Stygian Black Italic 14 to 48 point

Tempo Light 12

Ludlow 28-L Tempo Light 6 to 72 point

Tempo Light Italic 34

Ludlow 28-LI Tempo Light Italic 10 to 72 point

Tempo Medium 56

Ludlow 28-M Tempo Medium 6 to 72 point

Tempo Medium Italic 78

Ludlow 28-MI Tempo Medium Italic 8 to 48 point

Tempo Medium Cond. 53

Ludlow 28-MC Tempo Medium Condensed 30 to 96 point

Tempo Bold 90

Ludlow 28-B Tempo Bold 6 to 72 point

Tempo Bold Italic 51

Ludlow 28-BI Tempo Bold Italic 12 to 72 point

Tempo Bold Condensed 26

Ludlow 28-BC Tempo Bold Condensed 6 to 96 point

Tempo Bold Condensed Italic 73
Ludlow 28-BCI Tempo Bold Condensed Italic 18 to 72 point

Tempo Heavy 48
Ludlow 28-H Tempo Heavy 6 to 72 point

Tempo Heavy Italic 20
Ludlow 28-HI Tempo Heavy Italic 12 to 72 point

Tempo Heavy Condensed 67
Ludlow 28-HC Tempo Heavy Condensed 6 to 96 point
also 120 and 144 point

Tempo Heavy Condensed Italic 5
Ludlow 28-HCI Tempo Heavy Condensed Italic 10 to 72 point

Tempo Black 96
Ludlow 28-EH Tempo Black 12 to 72 point

Tempo Black Italic 81
Ludlow 28-EHI Tempo Black Italic 14 to 72 point

Tempo Black Condensed 75
Ludlow 28-EHC Tempo Black Condensed 14 to 72 point

Tempo Black Cond. Italic 6
Ludlow 28-EHCI Tempo Black Condensed Italic 18 to 72 point

TEMPO BL. EX.
Ludlow 28-EHE Tempo Black Extended 18 to 48 point

TEMPO INLINE 40
Ludlow 28-HN Tempo Heavy Inline 18 to 48 point

Ultra-Modern 63
Ludlow 22-M Ultra-Modern 12 to 72 point

Ultra-Modern Italic 72
Ludlow 22-MI Ultra-Modern Italic 12 to 48 point

Ultra-Modern Bold 19
Ludlow 22-B Ultra-Modern Bold 14 to 72 point

UMBRA 28
Ludlow 34 Umbra 18 to 72 point

Underwood Bold 39
Ludlow 23-UB Underwood Bold 10 and 12 point

Appendix VI

TEXT
and DISPLAY TYPE
Combinations

Bernhard Cursive Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Bodoni Book

Bodoni No. 275

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Bodoni Book

Bernhard Cursive Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Bodoni Book

Caledonia Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Bodoni Book

Spartan Heavy

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sor-

Bodoni bold # 275

Ultra Bodoni Italic

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sor-

Bodoni bold # 275

Century Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sor-

Bodoni bold # 275

Cheltenham Bold Extra Condensed

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Antique #1

SPARTAN BLACK CONDENSED

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Antique #1

Memphis Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Antique #1

Bernhard Cursive Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Caslon # 337

Caslon Bold Ital.

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Caslon # 337

Lydian Cursive

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Caslon # 337

Bernhard Modern

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Modern 8A

Lydian

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Modern 8A

Masterman

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Modern 8A

Century Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Linotype Caslon

Cheltenham Wide

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Linotype Caslon

Bodoni Bold Condensed

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Linotype Caslon

Caslon Bold Condensed

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow

Caslon #3

Lydian Cursive

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow

Caslon #3

Century Schoolbook

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow

Caslon #3

Nicholas Cochin

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Electra Bold

Karnak Medium

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Electra Bold

Stellar Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Electra Bold

Bernhard Cursive Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Baskerville Bold

Caslon Bold Italic

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Baskerville Bold

Masterman

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Baskerville Bold

Bodoni Bold Condensed

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Century bold

Karnak Black Condensed

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Century bold

Spartan Heavy

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Century bold

Nicholas Cochin

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Fairfield

Stellar Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Fairfield

Caledonia Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to

Fairfield

Spartan Heavy

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Spartan Medium

Memphis Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Spartan Medium

Karnak Black Condensed

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Spartan Medium

Spartan Heavy

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Garamond #3

Ultra Bodoni Italic

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Garamond #3

Stymie Extra Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Garamond #3

SPARTAN BLACK CONDENSED

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Garamond #3 bold

Cheltenham Bold Extra Condensed

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Garamond #3 bold

SPARTAN BLACK

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis medium

Memphis Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis medium

KARNAK OBELISK

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis medium

Stymie Extra Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis bold

SPARTAN BLACK COND.

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis bold

Cheltenham Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis bold

Caslon Old Style No. 337

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm faith in

Deepdene

Garamond Bold Ital.

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm faith in

Deepdene

Caledonia Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm faith in

Deepdene

Bodoni Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis medium

Lydian Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis medium

Gothic No. 2

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to man-

Memphis medium

Deepdene Ital.

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow

Primer

Bell

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow

Primer

Perpetua

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow

Primer

Scotch Roman

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Scotch Roman (mono)

Lydian Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Scotch Roman (mono)

Spartan Medium

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and

Scotch Roman (mono)

Goudy Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm faith in fundamental human

Weiss Roman (lino)

Spartan Medium

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm faith in fundamental human

Weiss Roman (lino)

Memphis Medium

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm faith in fundamental human

Weiss Roman (lino)

Memphis Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Weiss Roman Bold (Foundry)

Lydian Bold

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Weiss Roman Bold (Foundry)

Spartan Heavy

We the peoples of the United Nations determined to save succeeding generations from the scourge of war, which twice in our life-time has brought untold sorrow to mankind, and to reaffirm

Weiss Roman Bold (Foundry)

Appendix VII

Similar
TYPE-FACE
GROUPINGS

Lydian
Lydian Italic
Lydian Bold
Lydian Bold Italic
OFFENBACH
Radiant Medium
Stellar
Stellar Bold

BALLOON BOLD
BALLOON EXTRABOLD
CARTOON LIGH
CARTOON BO
Pen Bold
Flash

EMPIRE
POLO
Ryerson Condensed
Radiant Bold Extra Condensed

Lucian Bold
Egmont Bold
Metropolis Bold
Egmont Bold
Vulcan Bold

Bernhard Gothic Heav
Spartan Medium
Futura Demibold
Airport Bold
Kabel Bold
Futura Demibold
Vogue Bold
Metroblack No. 2
Metromedium No. 2
Spartan Heavy
Tempo Bold
Sans Serif Bold
Twentieth Century Bold

Corvinus Bold
Mondial Demi-Bold
Eden Bold

Stymie Bold
Beton Bold
City Compact Norr
Girder Heavy
Beton Bold
Cairo Bold
Memphis Bold
Karnak Medium
Rockwell Antique
Stymie Bold

HUXLEY VERTICAL
Slimline

Bodoni, Ultra
Nubian
Bayer Bold
Sphinx
Bodoni Modern
Bodoni, Poster
Bodoni Black
Stygian Black
Bodoni Ultra

STENCIL
Futura Black
STENCIL
BAM-STENC

Cloister Black
Engravers Old English
Goudy Text
Engravers Old English
Primitive
Caslon Text
Old English
Cloister Black
Eng. Old English
Goudy Text

Onyx
SLIM BLACK
SLIM BODONI
Poster Bodoni Compressed
Bodoni Campanile
ONYX
SPIRE

Lydian Cursive
Park Avenue
Piranesi Italic
Piranesi Bold Italic
Raleigh Cursive
Phyllis
Diane
Ariston Light
Ariston Medium
Discus
Sketch
Park Avenue
Artscript

Kaufmann Script
Gillies Gothic Light
Signal Light
Nova Script

Shaw Text
Wedding Text
Lino Text
Wedding Text

Paramount
Rivoli
Eve Roman
Eve Heavy
Rivoli

Corvinus Light
Mondial light
Eden Light

Keynote
Mandate

Kaufmann Bold
Romany
Gillies Gothic Bold
Britannic
Signal Medium
Gladiola
Coronet Bold
Stylus
Swing bold

Cooper Black
Goudy Extrabold
Rugged Black
Pabst Extra Bold
Ludlow Black
Cooper Black
Goudy Heavyface

Bernhard Brushscript
Ariston Bold
Glenmoy
Gloria
Broad-Stroke
Stylescript

Traflon Script
Coronet
Coronet Bold

Scribe
Hauser Script

Liberty
Bernhard Cursive
Mayfair Cursive

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