

THE UNIVERSITY OF MISSOURI BULLETIN

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JOURNALISM SERIES No. 23

SARA L. LOCKWOOD, Editor

**PICTURE PLATES FOR THE PRESS**

**Some Mechanical Phases of News and  
Advertising Illustration**

by

HERBERT W. SMITH

*Assistant Professor of Advertising,  
University of Missouri.*

*(Drawings by the Author)*



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ISSUED THREE TIMES MONTHLY; ENTERED AS SECOND-CLASS MAT-  
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## FOREWORD

This is largely a revision of Bulletin 14, Journalism Series, "Making the Printed Picture: a Treatise on Photo Engraving Methods" written by the author in 1916. The sections on stereotyping and a mat filing system are new. Other sections such as those on press work and engraving charges have been considerably changed.

As before, the author's chief obligation is to R. B. Teachenor, President of the Teachenor-Bartberger Engraving Company, Kansas City, Mo., for his reading of copy and consequent suggestions. The section on engraving charges he supplied entirely; also much of the section entitled "Engraving Definitions."

The section entitled "The Plate in the Printing Press" is based largely on the thirty-five years' experience of P. J. Seley, pressman for E. W. Stephens Publishing Company, Columbia.

Harry Meisenbach, press foreman of the Hugh Stephens Printing Company, Jefferson City, aided by Ben Seward, manager of the College Printing Department of the same concern, supplied the detailed information about the chalk relief overlay process and the mechanical gauge.

Other credits are given in footnotes throughout the text.

## PICTURE PLATES FOR THE PRESS

Pictures are a valuable stimulant to advertising. The business man who comes into possession of a "brand new" printing plate is tempted to see it in print. The reader of the advertising message is thereby given a mental image of the thing offered for sale far clearer than any that typed information alone could convey.

A knowledge of the mechanical side of picture-making does not, of itself, make one a good advertising worker—no more so than does a knowledge of typography, as many graduates of the "back office" of a print-shop have found. Familiarity with these mechanical factors helps to give the advertising man power and range

of expression. They help him to sell himself to others by giving him the basis for helpful service. They are his tools.

The newspaper advertising salesman bears a peculiar responsibility to the business men of his community. The editor of a country newspaper, in his capacity of publisher, advertising director, and job-printer, is asked regarding price of plates, how to prepare copy for the engraver, what screens to use, how to figure reductions, what reproduction methods will best serve different kinds of copy, and what kinds of



Fig. 1—Line copy. A pen drawing.

photographs will make the best halftone copy. The newspaper that is able to supply its advertisers with illustrations from its own matrix service\* and is also able and willing to help him to write his advertising copy has some very important elements needed for a steady growth on the business side.

On the news side of newspaper making, illustrations play just as important a part. Metropolitan papers have long maintained staff photographers who accompany reporters or go on special assignments for pictures. An art department and photo-engraving plant are often adjuncts to the most efficient dailies.



Fig. 2—*Line copy. A pen drawing with stipple shading.*

No paper, however small, need be without illustrations. Halftones, in matrix form, of world events are supplied very quickly and economically by various news-picture syndicates. Cartoons and comic strips are also syndicated. For the most efficient handling of these service pictures in the small newspaper shop, a stereotype casting outfit should be installed, which should not prove expensive in the initial cost and maintenance.

From the photo-engraver's standpoint, a better popular understanding of the mechanical side of picture-making is greatly to be desired. So long as the impression obtains that a photograph and a few chemicals are fed into the hopper of a machine which in a short time turns out the finished half-

\*See Chapter entitled "A Matrix Filing System."

tone, so long will the public fail to understand the true factors of time and skilled labor that enter into such production. Increased cost of production during and since the World War

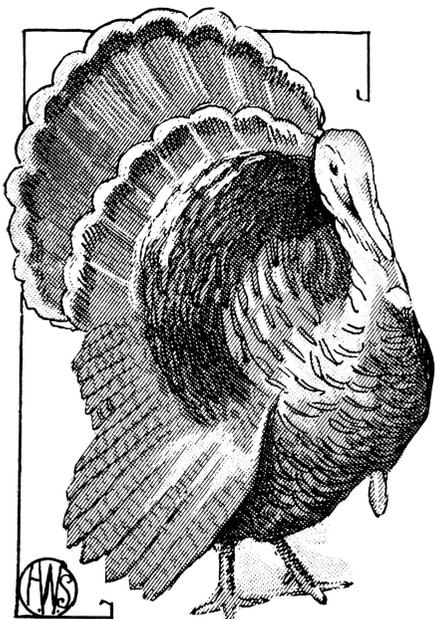


Fig. 3—*Line copy.*

*A Scraper-board drawing.*

has proven to the engraver the wisdom of his attempts in late years to educate the public. The mounting cost of the finished product has tended to check the increasing normal demand for engravings. Fortunately in some quarters, as newspaper making, syndicated matrix pictorial services have tended to distribute first costs and bring the product within the reach of the smallest paper.

To illustrate the value of intimate knowledge of mechanical processes, a recent experience of a Columbia professional man may be cited. He came into a local newspaper office and laid his illustrative problem before his friend, the advertising man. Mr. Professional Man was undertaking to promote a news event, one of the newer "Weeks" which has been established as an annual event to take its place alongside Farmers' Week, Journalism Week, and others. He wished to send the picture of the principal speaker to thirteen newspapers in which he hoped to get more or less extended press notices.

Of the thirteen, seven were metropolitan dailies, two were near city dailies, and four were weekly class publications. Mr. Ad Man reasoned that the metropolitan papers

would prefer photographs to ready-made halftone plates, inasmuch as most of the larger papers have their own art departments and their own art treatment of layout and decorative borders; and that the two near-city dailies had no engraving departments but could use mats (he happened to know that they had stereotyping departments). The four weekly class publications, he thought, probably had no engraving and stereotyping departments.

Mr. Professional Man had available five good photographs of the subject. He was told to send four of these to as many metropolitan papers on the list. The fifth he sent to an engraving concern with instructions to make one original zinc halftone, sixty-line screen, three electros and five mats. The four photographs and three of the mats were

sent to the metropolitan papers; the four plates were sent to the four weekly class publications and the remaining two mats were given to the two near-city dailies. Had thirteen original plates been made the cost would have been around \$40.00. Had one original and twelve electrotypes been made, the cost would have been about \$15.00. As it was, the total bill was in the neighborhood of \$9.00. Mr. Professional Man had the idea at first that he would have to order thirteen original plates.

It is certain that the engraving house would have saved him from this blunder, but it isn't certain that the engraver could have shown an insight into newspaper problems which the advertising man evinced in this case. It is quite likely that

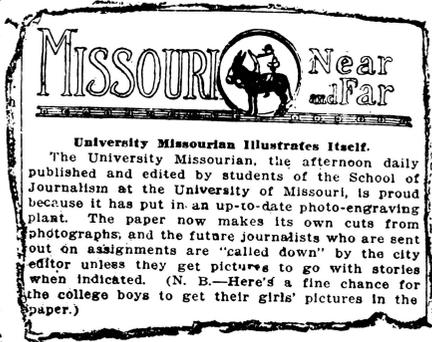


Fig. 4—Line copy.  
A clipping of type-matter

the problem would not have been laid so clearly before the engraver had the professional man been obliged to trust its details to business correspondence.

Highly efficient as the average engraving house is, it is not always able to protect the careless and uninformed customer from loss of time and money. The more intelligently the customer states his needs in his correspondence with the engraver, the more carefully he marks directions and identification inscription on his copy, the more thoroughly he understands that good clean copy is needed for good plate work, the more satisfactory will be the service of the engraver to him.

The main departments of an engraving house are: the business office, including superintendent, solicitors, clerks, stenographers; the art department, wherein each worker is adept in only one line, such as lettering, retouching, etc.; the engraving department, which is another department of specialists; operators, etchers, finishers and routers; and the shipping department, wherein the finished product is prepared for shipment.

## THE LINE ENGRAVING

A plate that reproduces black-and-white copy with no gray tones\* is called a line plate. It is usually etched† on zinc. A line plate has these advantages for the printer: cheapness, and ready adaptability to paper, ink and press. A line plate comes nearer to being "fool-proof" in the hands of the printer than any other engraving. It requires no "make-ready" or special grade of ink or paper. In fact, the cheaper and coarser grades of paper quite often yield the best results. In electrotyping, since the depth of etch is greater in the zinc line plate, better impressions are obtained than from the comparatively shallow-etched halftone.

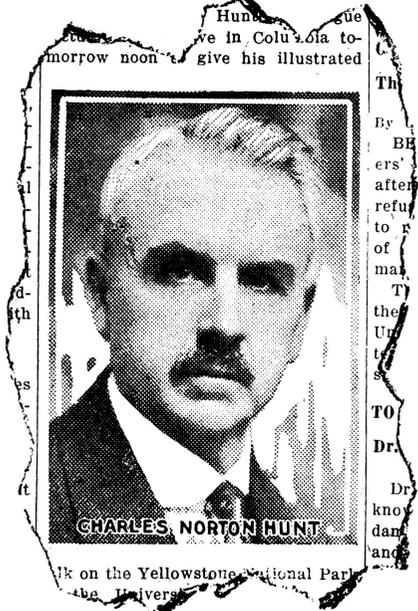


Fig. 5—Line copy.  
A halftone reprint.

In these points the zinc line plate is inferior to the halftone; range in tones of copy to be reproduced and range in the varieties of copy. The copy that is to be reproduced by this process, must have black lines or spaces on a white background or, reversed, white lines and spaces on a black background.

\*Tone is the relative amount of light reflected by an object. In this discussion, the object is a photo or drawing. In other words, tone is the amount of shadow and light in the various parts of a picture. Color is a quality apart from tone and is not treated here.

†To *etch* is to obtain printing depth for the lines or dots on metal by corroding (or eating away) the metal with acid.

Under the heading of line copy may be placed: (1) Pen drawings, Figs. 1 and 2; (2) pages of printed matter, Fig. 4; (3) black crayon and soft pencil drawings, Fig. 6; (4) halftone reprints (providing the ink is not gray and the screen used in making the original engravings from which the print is taken was coarse), Fig. 5; (5) scraper-board, Fig. 3. At first sight it would appear that copy of the third class would violate the basic rule that only black-and-white copy may be reproduced by the line process. The drawing, however, is made on a rough stock of paper—a surface with depressions and elevations. The elevations, or minute hills, catch the carbon



Fig. 6—*Line copy. A crayon drawing*

from the pencil and form a cluster of dots of irregular shapes. Considering the black dot as the unit, the copy is resolved into black and white tones. It is the same in principle as the pen stipple drawing (Fig. 2), the shading of which is made of dots produced by the pen point. The dots are blended by the eye into tones. Again the dot is the unit of shading and fulfills the rule. The coarse screen halftone reprint (4) as copy for reproduction serves as the equivalent of the stipple drawing. Pages or clippings of printed matter are treated the same as original line drawings provided the printer's ink is not grayed or the paper stock other than white. Scraper-board drawings (5) are made on especially prepared chalk surfaces, whose original patterns are parallel lines or stippled effects. A variety of tones are produced by scraping on the surface with a knife blade, lightly for a gray tone and heavily for white. Dark tones can be laid on the surface with soft pencil or crayon.

## MAKING THE LINE NEGATIVE

The old wet plate process, now obsolete in photography, is used for negative making in photo-engraving. It gives the advantage of economy, as the glass can be used over and over, and also gives the maximum contrast of tones in the negative.

A piece of clean glass is flowed on one side with an albumen solution and allowed to dry. In the sensitizing operation, the dried albumen causes the collodion to adhere to all parts of the surface of the glass. The collodion in turn, becomes the foundation for silver nitrate, the sensitizing agent. Collodion is a solution of ether, alcohol and guncotton, with certain chemicals added to increase its affinity for silver nitrate.

The collodionized glass, after being immersed for several minutes in the silver solution is sensitive to light. It is now carried from the dark room in a light-proof plate holder to the camera. Here the plate is exposed to light reflected back from the copy, which has been previously tacked onto a vertical board in front of the lens and parallel to the plane of

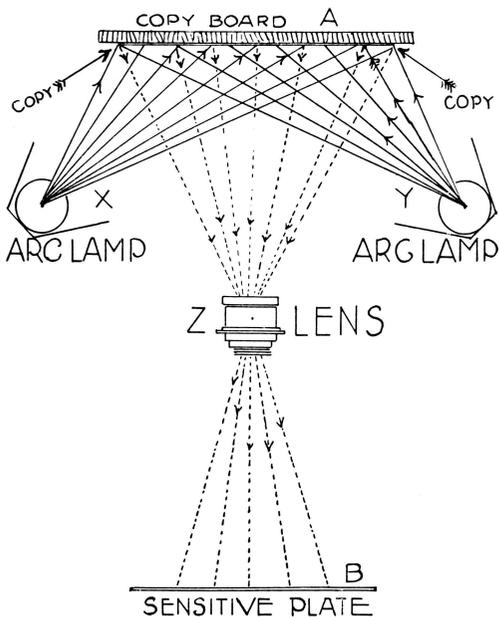


Fig 7.—Camera lighting arrangement  
(Viewpoint, above.)

the sensitive plate. Wherever on the plate the strongest reflected light falls, the densest opacity of tone will be built.

In other words, on the copy A (Fig. 7) are certain black lines and spaces on a background of white paper. Two arc lamps, X and Y, in front of and on each side of the copy send forth rays of light which fall on the copy. The white background of the copy absorbs very little light but reflects most of it back through the lens Z, which focuses the rays and brings them into a perfect image on the plate B. The size of the image depends upon the distance between the copy and the lens. Thus when a great reduction of the copy is desired, the copyboard is removed farther from the lens. The size of the image is measured upon the ground glass before the sensitive plate is brought from the dark room.

Now with the exposure of the plate under way, the dense portions of the image are being built by the action of the strong light reflected from the white background of the copy. Since the black lines and spaces on the copy reflect no light, the silvered collodion on the sensitive plate in corresponding parts is unaffected by the light and hence will become transparent in the later developing and fixing operations. The parts corresponding to the white paper of the copy will be black and absolutely opaque in the completed negative plate. Thus the tones of the original copy are reversed, giving rise to the term "negative," which is applied to the glass plate. Observe that the word "glass" is used here with "plate" to prevent confusion with the metal plate in its final stage, which is also termed "plate," "printing-plate," or "engraving."

After the negative is finished and dried, it is "stripped." That is, the collodion film on the glass is treated with certain coatings which enable it to be peeled from the glass plate as a thin membrane and laid on another clean piece of glass, after being turned over. This is for the sake of a reversed image to make the final print from the finished engraving the same as the original copy.

Figures 8 and 9 represent the evolutions of the image with

respect to position (right to left) and tone (positive and negative). Fig. 8 is the original copy—black lines and spaces drawn on a background of white paper. Fig. 9, No. 1, is the photographic image obtained on glass by the wet plate process—reversed in both position and tone. In 2, the film has been stripped and reversed (in position only—the tones are the same as in 1). In 3, the image has been transferred to a piece of zinc by a photographic process. The metal has been etched, mounted and is now a completed engraving. The image in 3 has been changed into a reversed positive print. By 4 is represented the final appearance—a reproduction of the original copy, printed in ink on paper.



Fig. 8—*The copy.*

There is some danger that the film will tear or become distorted in stripping. This would be especially detrimental in certain kinds of color work or in reproduction of mechanical drawings, in which extreme accuracy is demanded. To obviate stripping, a prism is sometimes interposed between the copy and the lens, which automatically reverses the image.

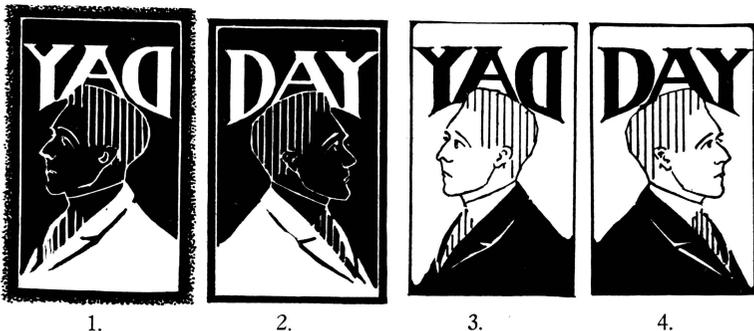


Fig. 9—*Evolution of the image with respect to tone and position (right to left).*

The stripped negative is used as a light filter in transferring the image to the metal. A piece of polished sheet zinc is sensitized with a bichromate fish glue solution. The film side of the negative is placed directly against the sensitized side of the metal and then exposed in a printing frame to strong light. The black, opaque part of the film acts as a barrier to the rays of light, consequently the soluble sensitizing coat of the metal directly behind this curtain is unaffected; i. e., remains soluble. The transparent lines and spaces of the negative, corresponding to the black parts of the original copy, allow free passage of the rays of light to the sensitive coating of the metal. This is rendered insoluble.

After this printing process has been completed, the metal is removed from contact with the negative plate and is given a thin coating of etching ink on the exposed side. The zinc plate is dropped into a basin of water, which instantly dissolves the parts of the sensitive coating

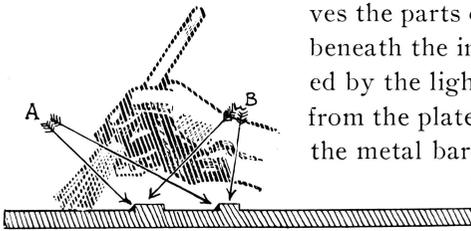


Fig. 10—Powdering the line plate (showing cross-section of zinc line etching). *A* represents dragon's blood embanked against edges of lines (*B*).

beside the parts of the sensitive coating beneath the ink that were not affected by the light. The ink also "lifts" from the plate in these parts, leaving the metal bare. The insoluble parts

of the coating remain on the plate with their uppercoat of ink. The zinc plate is then dried and dusted with a resinous powder which, when heated slightly, amalgamates with the ink to serve as an acid-proof covering for those parts of the metal. The back of the plate is coated with asphaltum varnish.

A weakened bath of nitric acid is now given the plate in a rocking tub. When a slight depth of etch has been obtained—that is, when the unprotected surface of the metal has been eaten down slightly—the plate is dried and treated with a

powdering of dragon's blood, a red, resinous powder. The powder is brushed lightly across the surface in four different directions. After brushing in each direction the plate is heated slightly to melt the powder. The object of the powdering is to protect the edges of the slightly raised lines from undercutting by the acid. The brushing embanks a small amount of powder against the edge of the line. The heat melts it and resolves it into an acid-proof coating. The brushing is so conducted as to keep the open parts of the metal free from powder.

When the raised parts of the metal are thus freed from the danger of being undereaten by the acid, the plate is returned to the etching bath and given another "bite" in the acid. After a greater depth is reached and fresh surface of the edge of the lines is exposed, the plate is dried and repowdered in four directions as before. A third bite in the acid is now given. Usually three bites in the etching tub are sufficient to give ample printing depth to the raised lines. Sometimes more are given.

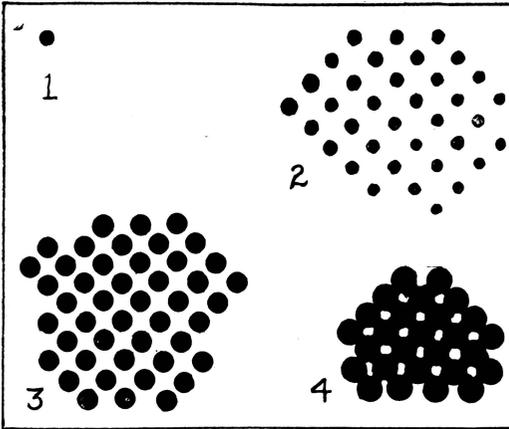
The larger open spaces on the metal plate are "routed," or deeply cut out with a high powered drill. This gives additional freedom from the possible clogging of printer's ink in the press. The metal is nailed to a wooden block of such thickness as to make the mounted engraving type-high. The edges are planed to bring the plate within the limits of the column rules. The use of a type-high planing machine is sometimes necessary if the wooden backing has absorbed moisture and has swelled. Since wood is very susceptible to atmospheric changes it often needs such attention, no matter how carefully the engraving has been made.

## THE HALFTONE

The halftone process is especially adapted to the reproduction of copy with middle tones—gray tones ranging between white and black. The purpose of the engraving is to

secure a distribution of ink in the final print by means of dots of different size whose massed effect is tones.\*

The dot is the unit of tone in the halftone process. A single dot as shown in 1, Fig. 11, is black; a field of similar dots in 2 give the appearance of a gray tone. In this case



the eye blends the black tone of the dots with the white background of paper, and receives the impression of a gray tone. Larger black dots, placed closer together, yield a tone of darker gray, as in 3. When the dots are so increased in

Fig. 11—How dots produce tones.

\*The three kinds of printing surfaces are intaglio, plane and relief.

An intaglio engraving is one with sunken lines or spaces into which ink is rubbed; in the press-work the ink is lifted out by the paper. The original smooth surface of the plate yields no impression, since the ink is scraped off before the paper is brought into contact with the plate. Examples of this process are the etchings of such artists as Whistler, Pennell and Meryon, and the rotary photogravure process now coming into use as a method for newspaper pictorial sections. Intaglio plates can be printed only on special presses, entirely different in construction from the ordinary printing press.

On a planographic printing surface the lines of the design are neither raised nor sunken, but are on the same plane with the surface of the plate. The best example of this method is the lithographic process, requiring presses especially constructed, entirely different from the type presses.

The intaglio and planographic methods are capable of more refined gradation of tones than the relief method, as represented by the halftone, but are far more limited in application, owing to the fact that printing facilities different from the usual are required.

size as to join, as in 4, and present a field of black lightened by small white openings, the effect is a very dark grey tone, nearly black.

The problems of the halftone plate-maker in reproducing copy of several tones—for example a photograph—is to interpret the continuous and blended tones of the original by black dots of varying size. Necessarily some details of the original are sacrificed in this interpretation. The larger the scale of the dots, the greater is the loss of detail, and likewise the greater is the contrast of tones.

The screen is the new element introduced into negative

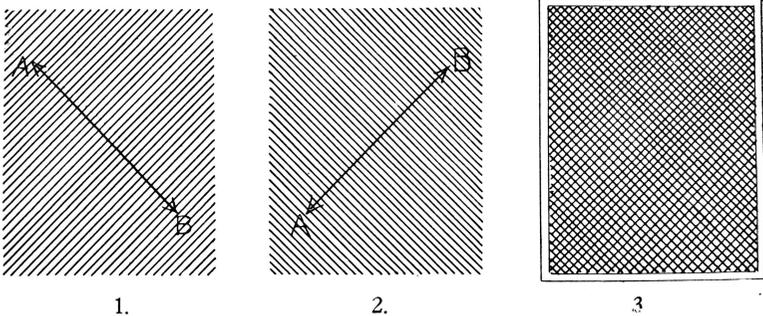


Fig. 12—The halftone screen. (*Spacing of lines is exaggerated.*)

making in the halftone process. It is a light filter used immediately in front of the plate of sensitive glass, to resolve the action of the light on the plate into a pattern of dots. The screen consists of two pieces of glass glued together and bound on the edges with an aluminum frame. Each piece of glass has on the inner surface a set of black parallel lines, either engraved (etched into the surface) or photographed. These are represented in Fig. 12, 1 and 2. The lines are ruled at an angle of 45 degrees to the edges of the glass and so arranged on the two pieces as to cross at right angles on the screen (Fig. 12, No. 3).

It is easily seen in 3 that the pattern of the screen consists of a great number of small squares. The denomination

of a screen is determined by the number of lines to the inch on each part of the screen. The directions in which the lines are counted are represented by the arrow AB in Fig. 12, Numbers 1 and 2. In a 60-line screen, the denomination used for the Columbia Evening Missourian's halftone plates, there are 60 x 60 or 3,600 squares in a square inch of surface. As each square of the screen is productive of a dot in the engraving, there are 3,600 dots in each square inch of the printed picture.\*

### SCREEN RULINGS IN RELATION TO PRINTING NEEDS

†The engraver should be informed what grade of paper is to be used so that he can select a screen of proper fineness or coarseness to show up well on such paper.

150-line screen—finest enamel papers.

133-line screen—fine and medium enamels.

120-line screen—medium and cheap enamels and extra smooth bond papers.

100 or 110-line—any of the above and smooth bond paper, S. S. & C. papers, "machine finish" or "English finish."

85-line screen—machine finished and good newspaper—cheap booklet work.

75-line screen—ordinary newspaper work on flat-bed presses—booklet work on cheap papers.

60-line screen—newspaper work for papers which stereotype their forms and print on rotary presses.

\*"When you realize that the whole scheme of halftone process is built around the halftone dot, of which there may be as many as 40,000 in a square inch, you can begin to appreciate the troubles of the halftone operator . . . . Keeping the dot intact is as essential to a good halftone as keeping the explosions of your auto-engine coming at regular intervals. When you missed one explosion, you knew there was likely to be trouble."—A. W. Morley, Jr., vice-president Electro-Light Engraving Company, in address before the T. P. A.

†From "Information About Engraving"—Teachenor-Bartberger Engraving Company.

## MAKING THE HALFTONE

The copy is placed on the upright copyboard of the camera and brought to the right size and focus as in the case of the line copy. The plate is sensitized the same way as the line plate.

### 1. *Line plate.*



### 2. *Halftone (60-line screen).*



Fig. 13—*The same copy under two different treatments.*

Considerable manipulation of camera appliances is necessary in halftone work. Only one exposure and one “stop” in the lens are used in line negative making; for a halftone plate two or three exposures and as many stops may be used. For those unacquainted with camera terms it may be explained that an “exposure” is a time interval during which light is admitted through the lens to the sensitive plate. A “stop” is a diaphragm that regulates the amount of light that passes through the lens. It also gives shape to the

dots that are built on the sensitive plate during successive exposures.

If the copy is well balanced in tones, there will be in it a large portion of middle tones with a small amount of deep shadows and high-lights. Such pictures give little or no trouble to the halftone operator. When gray tones prevail throughout and shadows are lacking, measures for increasing

SCREEN DENOMINATIONS



*100-line screen halftone*



*150-line screen halftone*



*85-line screen halftone*



*120-line screen halftone*



*60-line screen halftone*



*Metzograph screen No. 1.*



the contrast of tones may be necessary. If dark tones are prevalent they must be lightened in the final reproduction. The halftone process always makes for decreased contrast.\* For instance, a pen drawing with black letters on a background of white paper, although legitimately line copy, may be reproduced by the halftone process. The results are shown in the accompanying illustration. Fig. 13, No. 1, is the line reproduction; No. 2, the halftone. In No. 2 the background is a field of uniform small black dots, giving the impression to the eye of a light gray tone. The face of the black letters is lightened by small white openings. From 1 to 2 there is a great diminution of contrast.

When the copy has black shadows a very small circular stop is used during the first exposure. A piece of white paper is pinned over the copy. White absorbs little light but reflects the most; the black shadows of the copy absorb nearly all of the rays of light and reflect few. The relative size of the dots that will be built on the sensitive plate during the triple exposure depends upon two factors: the diameter of the stop in the lens and the relative amount of light reflected back from the different parts of the copy. Consequently a black shadow in the original copy would not furnish enough reflected light to build dots in the corresponding shadow parts of the negative. The function of these shadow dots in the negative will be explained later.

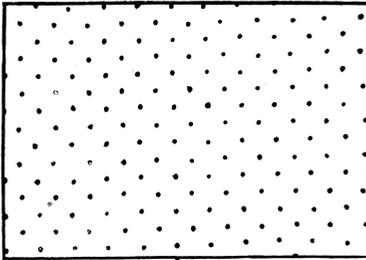
\*Halftone, n. *Fine Arts*. An intermediate or middle tone in a painting, engraving, photograph, etc.; a middle tint neither very dark nor very light.

The name alludes to the fact that this process was the first that was practically successful in reproducing the halftones of the photograph.

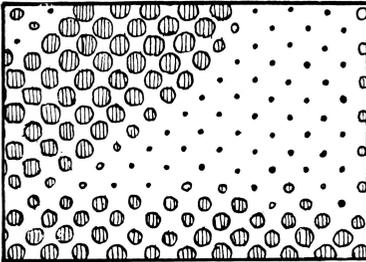
—*Webster's New International Dictionary*.

Tones thus interpreted have a strong tendency to be pulled down from the upper extreme of the tone scale (white) toward the middle tones. An artificial lightening of black passages, necessary from the pressman's standpoint (because black portions of a halftone plate, unrelieved by white dots, are likely to print as a muddy gray) has a similar tendency to work up from the lower extreme of the tone scale toward the middle portion; hence a loss of contrast.

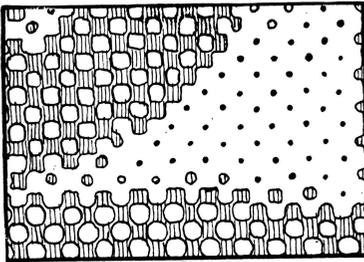
The exposure with the white paper over the copy



1.



2.



3.

Fig. 14—Showing the growth of dots on the halftone negative during three successive exposures.

took place correspond to the parts of the original picture that are light in tone. All the dots grew except those in the deepest shadows where the reflected light from the original copy was too feeble to build up the dots

builds up a field of small uniform dots on the sensitive plate. That is, if the plate were removed from the camera to the dark room and developed at this juncture so that the latent image would become visible, there would appear, not the reproduction of the picture on the copy-board, but a field of uniform, disconnected, round dots.

Each dot is a picture of the opening in the lens and is placed behind the center of a square in the halftone screen. Each square in the halftone screen is a focusing area for the propagation of this image.

Fig. 14, No. 1, represents the field of dots on the sensitive plate after the first exposure. During the second exposure (No. 2) certain dots in the field that was formed during the first exposure increase in size. The passages where the growth

parts of the original pic-

ture that are light in tone.

All the dots grew except

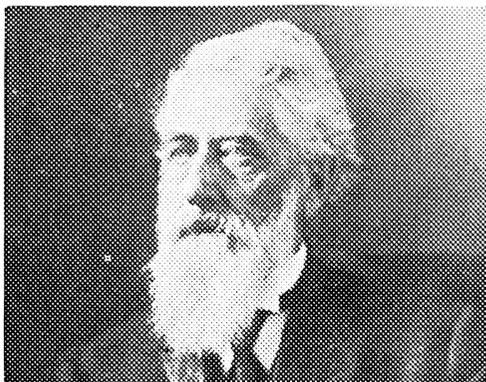
those in the deepest shadows

where the reflected light

from the original copy was too

feeble to build up the dots

of the first exposure. It is now apparent that the first exposure with the white paper pinned over the copy was for the purpose of creating dots in the shadow parts of the negative where there fell little or no light from corresponding parts of the original copy.



A.

In the parts of the negative corresponding to the lightest parts of the copy, it is necessary to build the largest dots. The necessity for this will be shown later. The dots must be of such size as to enable them to join at the corners in a checkerboard formation. The third and last exposure, Fig. 14, No. 3, that is given to the negative is for the purpose of enlarging and joining the dots in the high-light passages.



B.

Fig. 15—Showing 50-line halftone and negative made from the same copy.

Fig. 15, A, is a halftone reproduction of a photograph. Fig. 15, B, is a reproduction of the halftone negative from the same photograph.

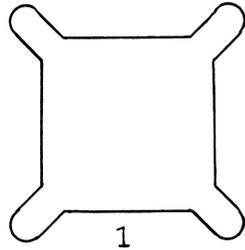
The lightest tone of A is the collar. This is the darkest in the negative, B. Observe the large, black dots joined at the corners. The coat, collar and necktie which are darkest in the photograph, are lightest in the negative, or rather have the greatest transparency. The black dots in this passage are small, round and isolated. The dots in the background of the negative are larger, approaching the square in shape, toward the upper righthand corner, where they are connected as in the collar.

For the third exposure, specially shaped stops are often used in the lens.

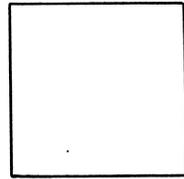
Fig. 16, No. 1, a square stop with extended corners, is sometime called a Horgan stop after the originator, S. H. Horgan. Another name is the "eared" stop because of the fancied resemblance of the corners to ears. A square stop (Fig. 16, No. 2) is often used. Many halftone operators are partial to the round stop (Fig. 16, No. 3) because gradation of tone is best preserved by its use.

Since the dots are images of the stop, it is apparent that the extended corners of the eared stop (Fig. 16, No. 1) will assist their joining in the high-lights.

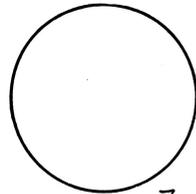
In Fig. 17 is shown a group of high-light dots behind the square of the halftone screen. The corners of the eared and square dots overlap behind the black lines of the screen. They do this because of the diffusion and bending of the rays of light around the black lines as they pass through the screen to



1



2



3

Fig. 16—Stops used during the third exposure.

the plate. The distance between the screen and the plate and the length of exposure regulate this diffusion.

When the square stop is used (Fig. 17, No. 2) the corners join more reluctantly. The likelihood of failure of the dots to join is still greater when the round stop is used (No. 3).

In other words, the operator has the greatest latitude in timing the exposure when No. 1 is used and the least when No. 3 is the stop.

When contrast is lacking in copy, the use of the eared stop insures more brilliancy of contrast but tends to lose details in the shadows. If the original copy is well balanced, so that there is no necessity for change in the relation of tones, the round stop is best.

The length of the exposure depends upon the condition of copy, the strength of the light and other factors. It is a matter of judgment for the operator. Poor copy often causes many unsuccessful trials, spoiled negatives and loss of time. The operator examines with an enlarging glass the condition of the dots after the negative is developed. If the shadow dots are too large and the high-light dots joined too closely, allowing insufficient transparency, he must reduce the size of the dots with a cutting solution. If the high-light dots have failed to join, there is no remedy—the negative must be remade.

A halftone negative requires far more skill and time in the making

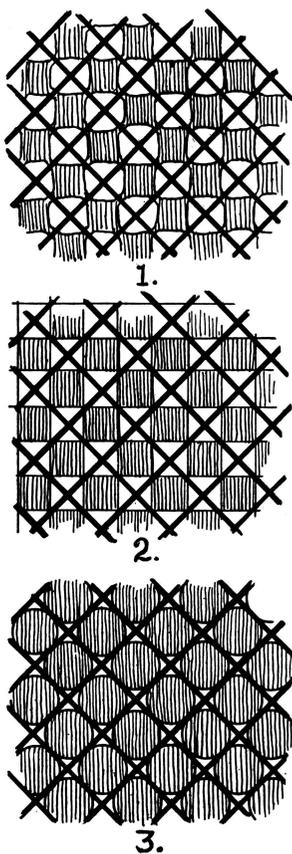


Fig. 17—High-light dots on the negative seen through the halftone screen (magnified).

than the line negative. This is one factor that enters into the higher cost of halftone engraving.

The halftone negative, like the line negative, must be reversed before being used to transfer the image to the sensitized metal.

### SUMMARY—THE HALFTONE NEGATIVE

Dots interpreting the tones of a picture are built on a sensitive plate during its stay of several minutes in the camera. A filter, whose pattern is minute squares, is interposed between the lens and the sensitive plate. This filter, or screen, resolves the image of the picture that is on the copyboard into dots on the plate. At intervals, while the glass plate is still in the camera, the opening in the lens is changed from small to larger diameters in order to create a relation of sizes in the dots that are being formed on the negative plate to correspond to the tone relations of the original picture, except that the tones of the negative plate image will be the reverse of those of the original.

Each dot on the negative plate is a replica in shape of the opening in the lens. The size of the dot depends (1) on the strength of light reflected from the corresponding part of the original picture and (2) upon the size of the opening in the lens.

The halftone negative is a light filter used in transferring the image to the surface of the metal preparatory to etching.

### ETCHING

Whether the metal is zinc or copper depends, in halftone work, upon the denomination of the screen, the quality desired and the intended use of the engraving. As a rule, when the screen is finer than 100 lines, copper is used. With a screen of 100 lines, or coarser, zinc may be employed. In newspaper work, economy demands the use of zinc. Copper is tougher and more durable, but considerably more expensive.

The difference in the handling of zinc and copper in half-tone work is not materially great. The enamel process is used in sensitizing the surface of the metal when the screen is fine. A coarse screen negative permits the use of the inking process that is employed in zinc line etching. The enamel is a fish-glué bichromate solution similar to the sensitizing solution for line etchings, except that it is much thicker. An added amount of fish-glué gives it a body with which to resist acid.

A piece of metal of the correct size is coated with the enamel solution and dried. Its surface is now sensitive to strong light. The film side of the stripped negative is placed

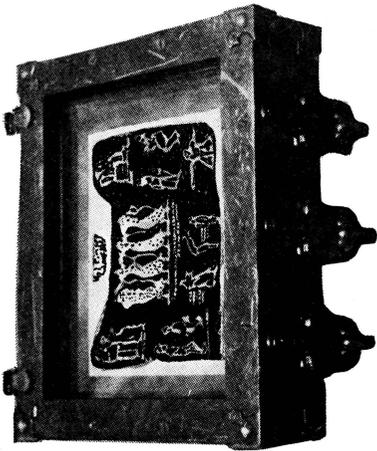


Fig. 18—*The printing frame exposed to light.*

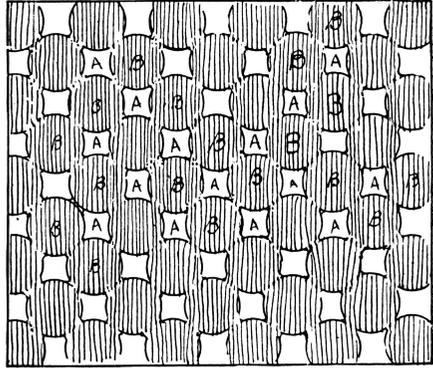
against the enamel surface of the metal and both are locked in a printing frame. After several minutes' exposure to light, parts of the enamel are rendered insoluble. Other parts remain soluble. The parts made insoluble are those immediately behind the transparent parts of the negative. The enamel behind the dots receives no light, hence remains soluble. After the exposure, running water removes the soluble enamel,

leaving the metal bare in those parts. The enamel dots that remain correspond to the transparent parts of the negative.

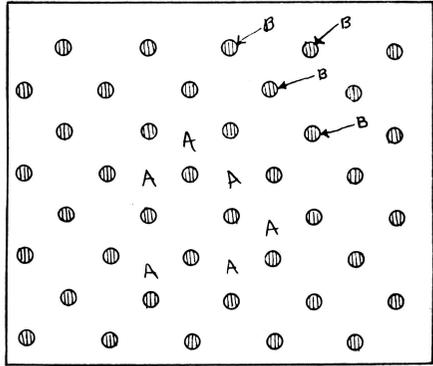
Fig. 19, No. 1, represents the high-light portion of a negative, densely spread with dots joined at the corners. When the image is transferred to the metal, the transparent openings (clear glass) in the negative labeled A will constitute the area of the enamel dots. The bare surface of the metal will correspond to the parts of the negative labeled B.

The enamel dots are those that will be left standing in relief in the finished engraving to yield their black impressions to the paper. The necessity for the junction of the dots in the negative is apparent after a study of Fig. 19. Should the dots B in 1 fail to join, the spaces A will be connected as in 2 and yield too dark a tone in the final print.

No. 2 of Fig 19, represents a shadow part of a negative. Since the transparent ground A is continuous, the enamel on the metal will remain continuous with the exception of the tiny spots back of the dots labeled B. These spots on the metal will retain no enamel, hence will be subject to the corroding power of the acid. As a result they will appear as sunken places in the finished engraving. Their function is to introduce light into the shadows and gray them. Without them the printed halftone would be jet black in the shadows—a condition that



1.



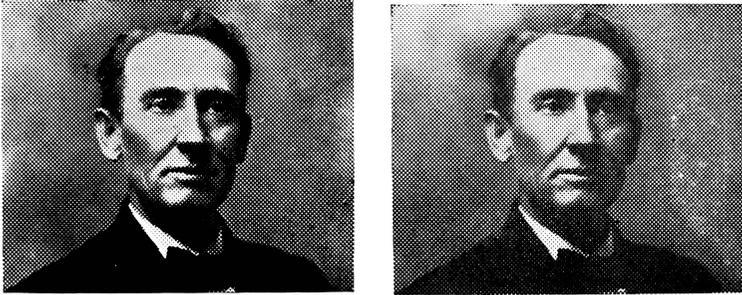
2.

Fig. 19—Showing the relation of the dots on the negative to the enamel dots on the metal. The shaded dots (B) in 1 represent the high-light dots on the negative. Those in 2 represent the shadow dots (B) on the negative. The open spaces, labeled A in both 1 and 2, represent clear glass in the negative which gives way to enamel dots on the metal.

might impair the balance of the tones on the printed page. Shadow dots are especially desirable when the plates are to be stereotyped.

If the shadow dots (B) on the negative, Fig. 19, No. 2, are too large, the print made from the completed engraving will be too gray in the shadows. They will result in a flat, contrastless halftone picture.

In Fig. 20, is shown a picture under two treatments. In preparing the halftone negative for No. 1, the shadow dots were dispensed with entirely. The shadows in this picture



1.

2.

Fig. 20—A halftone without and with shadow dots (60-line screen).

yield a jet black tone entirely unrelieved by white dots. In No. 2, the shadow dots were made large on the negative. The resulting picture printed from the plate is gray in the shadows. A better reproduction of this picture would have shown the shadows not so black as in No. 1, nor so gray as in No. 2. The engraver can regulate the amount of contrast to a considerable extent, although the tones of the original photograph limit him. For instance, it may be possible for him to make a slight increase in contrast in reproducing an extremely gray photograph, but he may not be able to make it into an engraving that will print a picture with well-balanced tones.

When the sensitized metal has been exposed in the print-

ing frame sufficiently long, it is removed and held under running water. The soluble parts of the coating are washed away from the metal. Heat is then applied to harden the enamel, after which the plate is ready for the etching bath. Acid in a rocking tub is dashed back and forth across the face of the plate until the open parts of the metal are eaten down, leaving the enamel dots standing in relief.

The form and area of the dots undergo a change during the etch. Fig. 21, No. 1, represents in the upper left corner (A) the enamel dots in the high-lights before the etch begins. As the etch progresses the acid eats *downward* and *laterally*. The lateral action of the acid decreases the diameter of the dots by undercutting the enamel-protected surface, leaving an umbrella-like fringe. When this fringe is broken off by brushing, the enamel dots (now in relief) have the appearance of the dots in Fig 21, No. 2, upper left corner (A).

It is highly important that the enameled dots in No. 1, A, be as large as possible without being connected at the corners, else the dots would reduce in diameter and finally disappear before sufficient depth had been attained in the etch (No. 2, A).

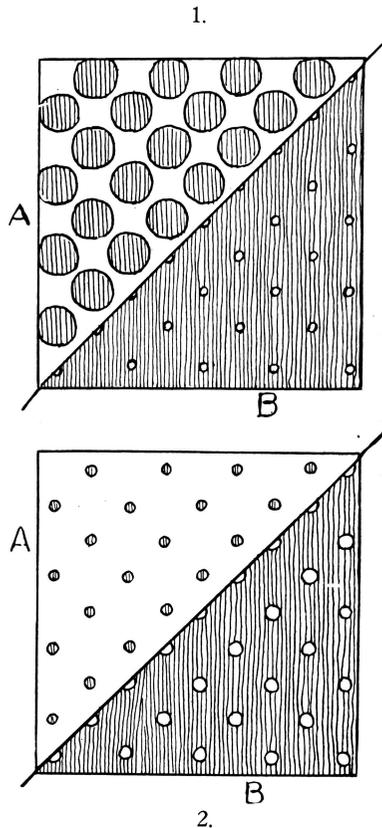
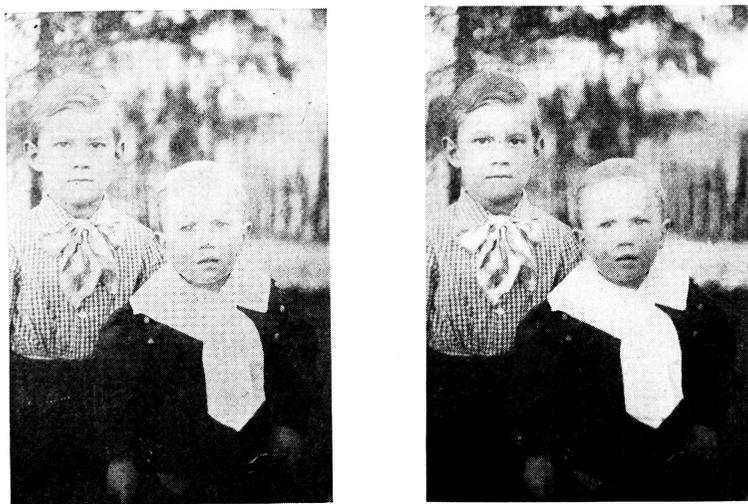


Fig. 21—How enamel dots on the metal plate change during the etch.

In the lower right corner (B), No. 1, is represented the small openings of the enamel in the shadows. When the plate is etched (B), No. 2, these openings have an increased diameter as well as depth.

## RE-ETCHING

It frequently happens that after a halftone plate has been etched as far as the dots in certain places may stand, other



A.

B.

Fig. 22—A halftone “flat-etched” (A), and re-etched (B).  
(120-line screen)

parts of the surface may need further etching. This is often the case in reproducing a flat or an over-“contrasty” picture.

When the copy is flat and contrastless, re-etching will give brilliance to the high-lights and shadows. Details in the shadows may be brought out by re-etching an over-“contrasty” plate.

Re-etching consists in painting out with acid-proof varnish the parts that are etched enough and in returning the plate to the etching bath. The plate may be removed from

the acid and parts may be painted out again, preparatory to a third etch, and so on, until the relations of the tones on the plate are improved. Between etches the plate-maker may clean the surface of the plate and rub a white powder (magnesia) into the crevices between the dots to determine the condition of the plate.

After the final etch the edges of the plate are beveled or rabbeted by a power machine in order to provide space for nailing the metal to the wooden backing. The mounted plate is then planed on the edges and back (if more than type-high). It is now ready for the printer.

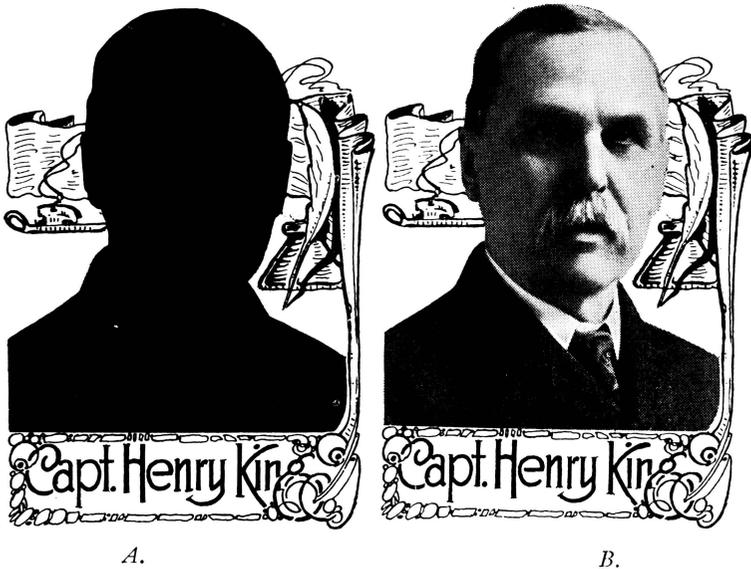


Fig. 23—(A) Pen decoration with silhouette for halftone insert.  
 (B) A combination line and halftone picture (85-line screen).

## COMBINATION OF LINE AND HALFTONE

Combinations of the two methods are represented most frequently by the halftone news picture and its surrounding line border design. The photo is first taken to the art de-

partment, where a pen border design with silhouetted or blackened panels is drawn. The engraver makes a line negative from the drawing. Then he makes separate halftone negatives from the photographs. The line negative is then stripped and

## HOW TO REPRODUCE VARIOUS KINDS OF COPY

Compiled by W. H. BAKER, Cleveland, Ohio

Copy	Halftone	Metzograph	Line
Wash drawing, water color, etc. . . . . (1)	Good	Good	No
Line drawing (pen-and-ink) (2)	Good if re-engraved	Fair	Best
Crayon, charcoal or pencil drawing . . . . . (2)	Good	Best	Good
Photograph . . . . . (1)	Good	Good	No
Scraper board (lines, stipple, etc.) . . . . .	Poor	Good	Best
Reprint from wood engraving . . . . . (1)	Fair	Good	Good
Reprint from halftone . . . . .	Not recommended	Best	Fair if coarse screen
Reprint from line . . . . .	No	Fair	Best
Lithograph . . . . .	Fair	Best	Only fair
Steel and copperplate engraving . . . . . (1)	Good	Good	Fair
Etchings (dry point, etc.) . . . . .	Fair	Best	Fair
Maps, intricate rule work etc. . . . . (3)	No	No	Good if good copy
Combination wash and pen-and-ink . . . . .	Good	Good	No
Oil paintings . . . . . (1)	Good	Good	No
Type matter, writing, etc. (4)	No	No	Best

(1) May also be photographed on wood and engraved by hand: excellent for artistic results. (2) May also be drawn and photographed and cut on wood. (3) Wax engraving is preferable. (4) Wax engraving sometimes better adapted.

—Chart published by the Eclipse Electrotype and Engraving Company, Cleveland, Ohio

into its transparent parts (corresponding to the silhouettes or black panels of the drawing) are inserted the halftone negative films, which are made of such a size as to fit exactly into the transparent parts of the line negative. The print is then made from the negative onto the metal and etched. When the halftone part of the plate is etched sufficiently deep, it is

“stopped out” (painted over) with asphaltum or acid-proof varnish, and the remaining lines of the surrounding border are etched deeply after the manner of line plates.

## PHOTOGRAPHIC COPY FOR HALFTONES

\*A deep reddish-brown photograph, on gelatine paper, smoothly burnished, with intense shadows and bright high-lights, will make the best halftone reproduction. Avoid dead, unburnished copies or photographs containing a bluish tone. It is almost impossible to make perfect work from the matt-finish or gray photograph. In selecting photographic prints for copies, consider well the following: Solio paper, properly toned and given a glacey finish by squeegeeing on paraffined glass or tintype plate, is the best of all. “Aristo Platino” and papers of similar surface do not reproduce well. Platinum paper (smooth surface) with good black color makes good copy. Sepia prints do not reproduce in true values, the darks coming too dark and the lights too light. Of the developing papers, Glossy Velox is one of the best. Carbon Velvet is also good, reproducing like a smooth platinum paper. Excellent results can be had from Azo Grade C, Azo Grade F and the Smooth Artura papers. The glossiness of surface is essential for good halftone work. All rough papers are bad to work from.

Negatives and tintypes should never be offered as copy. Unfixed photos or proofs should never be sent to the engraver, as they turn black when exposed to the light. Remember that a good halftone cannot be made from bad copy, unless artist’s time is added to the charge. It is seldom that a photograph cannot be improved—there is usually a necessity to strengthen outlines or shadows and retouch high-lights, to create a greater contrast between the different parts of the picture. Where extra work is necessary it is impossible to

\*From “Information About Engraving”—Teachenor-Bartberger Engraving Company.

determine the cost without having the copy for inspection. A halftone reproduction from a halftone print is liable to show more or less "pattern" from interference of the two sets of cross lines.

## THE PLATE IN THE PRINTING PRESS

Many factors, including materials, equipment and workers' skill, must be combined with the finished product of the engraving shop before the ultimate is reached—the printed picture. Paper, ink, type and plates are the materials which the pressman takes; the press, rollers, gauges, planers and trimmers belong to his equipment. He combines these elements with such skill as he may command to produce certain effects on the reader's eye, whether the purpose be to sell goods, to inform, or to amuse. How very necessary it is to carry forward to the very last stage of the undertaking the care and skill that have been exercised from the inception of the idea through the making of the plate.

Beginning with the plate, although it has been made type-high the chances are, unless it has a solid metal base, that it has not remained so. The humidity, heat or cold to which the block may be subjected in the printing shop or elsewhere will cause a shrinking, warping or expanding of the wooden base.

Be sure that the block is absolutely flat. An engraving that rocks after being locked up in the form loosens surrounding quads and slugs, which work up and produce inky and blurred impressions on the paper.

How may one tell whether the plate is of the right thickness? A mechanical gauge is now on the market which registers the thickness of the engraving to 1-1000 of an inch. This thickness is recorded on a dial while the engraving is being subjected to the same pressure it receives under the actual weight of the cylinder of the printing press just as if the plate were on the bed of the press in the printing run.

If the dial indicates that the halftone is over type-high, the block is turned down and the wooden mounting is shaved off with a hand or power shaver. The cutter is again tested for height under the dial. If it is now slightly under type high, it is brought up to standard by pasting thin sheets of paper (graduated in thickness to the markings on the dial) to the back of the engraving. If some points are lower than others, they are built up proportionately.

It is customary to underlay the general run of halftone engravings to .918 inch.

Engravings that have an extremely heavy solid tone effect are underlaid to .921 inch to overcome any slurs that might show up in the printing on the bed of the press. These slurs will always appear unless the cylinder of the press has been very accurately and carefully pulled down to exactly the proper height above the bed of the press.

Vignetted halftones and hairline zinc etchings are underlaid to .913 so as to lose the appearance of the hard edges that have always a tendency to show up in the printing. The pressman thus avoids this black appearance of the edge of the halftone before he starts making the overlay make-ready.

The work of rectifying the height of the block should be done immediately before locking it in the form. Further delay might involve a change in thickness.

The fact that a halftone block is perfectly type-high does not mean that it will yield a satisfactory impression on the paper. The edges of the plate have a tendency to print up more strongly than the center. The larger the plate, the more pronounced will be this tendency. In general, the work of regulating the stress of the plate in the press involves preparation of the "underlay" and the "overlay." The underlay is a local treatment of the plate, while the overlay is concerned with the cylinder which passes over the plate in the press. These two treatments are collectively termed the "make-ready."

The underlay is a thickening of the plate by means of paper pasted to the back of the wooden base. In the better grades of printing, the pressman often applies concentric layers of paper to increase the thickness at the center. This is usually used as an inter-layer between the metal plate and its wooden mounting. It is used on the back of the plate only when the plate is very large. Other parts which need additional pressure may be located by proving.

The overlay is a more exact means to the same end. By this, varying pressure is applied to local parts of the plate by increasing the thickness of portions of the cylinder which passes over the plate and forces the paper against it.

Several methods exist, all of which involve the use of a raised or embossed proof of the halftone. The proof is placed on the cylinder in absolute register with the face of the engraving, so that each dot of the overlay registers exactly on its corresponding raised dot of the plate. Unless this last named condition obtains the overlay is worse than useless. Four kinds of overlay are most commonly used. One is a thin sheet of zinc on which a proof of the engraving is printed directly from the plate. A slight etch in nitric acid is given the sheet, producing a raised effect. Another is a chalk relief overlay.

Many capable pressmen claim that the chalk relief overlay offers the best way to get all of the details out of a halftone. This kind of overlay is prepared by taking an impression on the press of the plates to be made ready. The impression is made with a specially prepared chemical ink on a specially prepared chalk coated paper with a glossy finish. This sheet with the printed impression is then immersed in a chemical bath which etches away the chalk on the surface of the paper where it has been touched by the chemical ink. The etching away is, of course, in proportion to the amount of ink, which in turn is in proportion to the solid tone effect in the halftone. The overlay is taken from the bath and dried

between blotting paper. The paper is then very thin in the high-light and very thick in the solid. This overlay is fastened to the make-ready sheet around the cylinder of the press in exact register with the corresponding face of the halftone that is locked in the form on the bed of the press.

There are many advantages to this method of overlay, principally saving in press time due to the make-ready being prepared in advance of placing the form on the bed of the press, and the possibility of saving the make-ready from time to time for additional runs. The printing results are said to be much finer and the method of making ready more interesting than the hand cut overlay method.

The two other methods are based on "pulling" a proof from the engraving and building an embossed effect from the inked proof on paper. This is done by dusting emery powder across the surface. The powder that adheres to the ink is incorporated with it by a slight heating of the paper. A smooth varnish is afterwards applied.

The make-ready is impracticable for newspaper plates. The most that can be done for these is to add to the thickness of the block by pasting layers of paper on the back, without giving time to a local increase in thickness. Then, too, a proper overlay will secure the necessary stress in the press and give sufficient pressure from above on the correct areas. Any attention to them whatever is an improvement on the tendency of many pressmen to lock the block in the form without any preparation.

The discussion thus far has been mostly of means for increasing pressure. Too great pressure, on the other hand, is as much an evil as insufficient. The edges of a halftone plate will print harshly and even threaten to break through the paper. The small raised dots in the high-lights may break down, causing a dirty smudge in corresponding parts of the final print. A line engraving suffers especially from too great

pressure. The "shoulders" of the metal left on the plate by the router drill may show up in the print.

The remedy is to decrease the thickness of the block. Sandpapering the wood base may be resorted to, although this crude method is not likely to produce uniform thickness. Here again, a type-high machine is of the utmost value to the printer.

Careful cleaning of the plate with gasoline and brush before starting the press will obviate another evil, dirty plates. Brushes with fine metal bristles are now on the market for the purpose. Brushing at an angle of 45 degrees (coinciding with the direction of the rows of dots on the plate) removes the bits of lint, ink, and other matter that accumulate between the dots. Clean all plates before filing them away. If lye is used in cleaning forms containing type matter and engravings, it should be neutralized with diluted acetic acid or vinegar, because lye tends to corrode some metals, especially zinc. Never hold a paper wrapping of a plate, especially a copper plate, in place with a rubber band, since rubber has a corrosive effect. Fasten the wrapper with a gummed strip or piece of string.

Improper distribution of ink may be the result of using stiff ink in cool weather or soft ink in warm weather. Use seasonable rollers, free from holes and other defects. Never use soft ink on a hard roller.

Engravings that are etched too shallow will never give satisfactory results, no matter how careful the presswork. The printer may easily diagnose the trouble in the case of zinc line engravings, inasmuch as the raised parts of the printing surface are comparatively far apart. The depth of the etch is more easily discernible than in a halftone. Experience will soon teach one what to expect in a satisfactory line etching.

Gauging the depth of the dots in a halftone plate is not so easy. Some printers profess to do this by rubbing the tips

of the fingers or the palm of the hand across the plate to get the "feel" of the dots. The use of an enlarging glass would be much better.

A more scientific method in gauging both kinds of engravings is the use of a micrometer instrument especially designed for the purpose.

Another instrument of value to printers is a gauge for determining the screen denomination of halftones. This information is of the greatest value in deciding the kind of paper and ink. The screen denomination of a halftone that has been newly made is known, but after an engraving has been stored away and later brought out for use, the screen number is probably forgotten. The printer would do well to mark the numeral on the plate before filing it away. If an old halftone of unknown denomination is brought in by a customer the problem may be vexatious. At least one engraving firm, as a mark of service to the customer, has established the practice of stamping the screen numeral with a die on the beveled edge of the metal.

## HOW TO DETERMINE PROPORTIONAL REDUCTION

In this specific example, the drawing AEXF is to be made into a plate  $2\frac{1}{2}$  inches wide. The printer wishes to know before the engraving is made what will be its height.

From the corner A of the drawing (Fig. 24) measure a distance AB ( $2\frac{1}{2}$  inches) on the base line AF. From B erect a perpendicular line BC to intersect the diagonal AX. The distance BC can be measured. Its length,  $3\frac{3}{4}$  inches, will be the height of the engraving.

These lines are to be made lightly with a pencil and are to be erased before the drawing or photograph is sent to the engraver. They should not be made a part of the instructions given to the engraver.

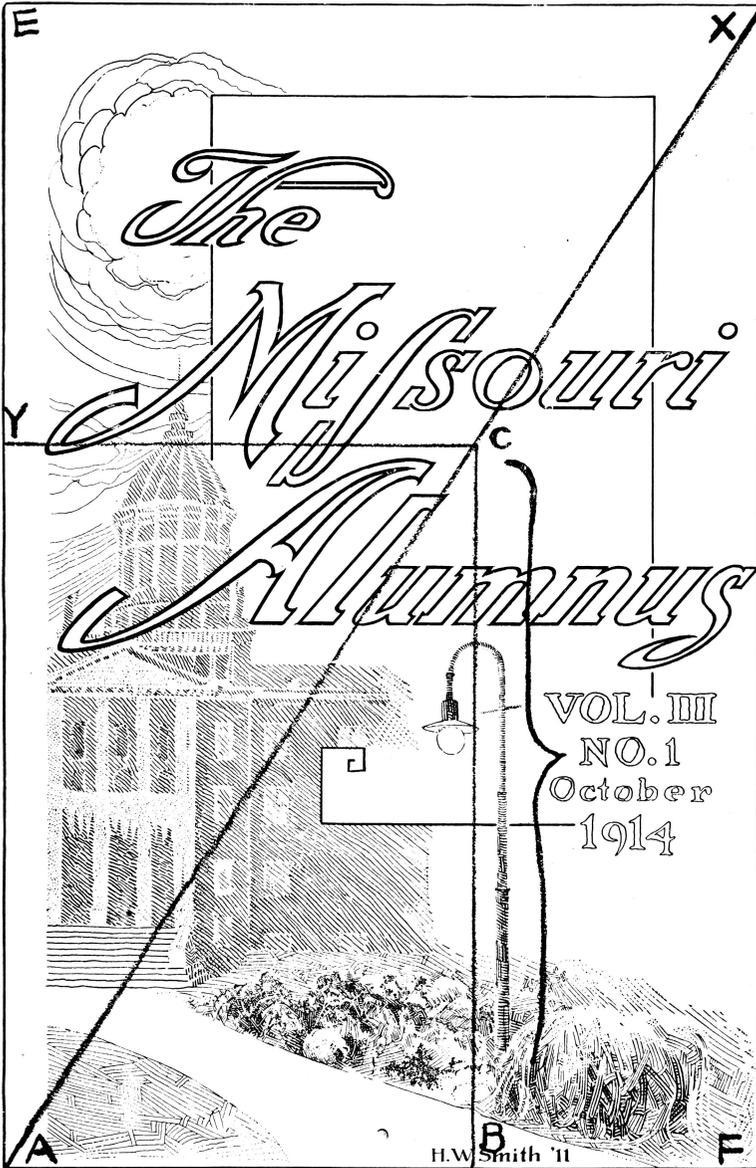


Fig. 24

## HOW TO DETERMINE THE PROPORTIONS OF A DRAWING

In this problem the size of the engraving (not made as yet) is known. The draftsman wishes to know what must be the proportions of his drawing (also not made), so that it may be reduced to the proper size.

In Fig. 25,  $AB-CD$  represents the desired size of the engraving. Extend indefinitely the lines  $AB$  and  $BC$ . Extend the diagonal  $BD$  indefinitely. Upon one of the two extended lines  $AB$  or  $BC$  ( $BC$  for example), lay out a width  $BX$ . This will be the width of the drawing. The distance  $BX$  represents an arbitrary decision of the artist. He can make it twice or thrice the desired width of the engraving. It is better to make it no greater than three times.

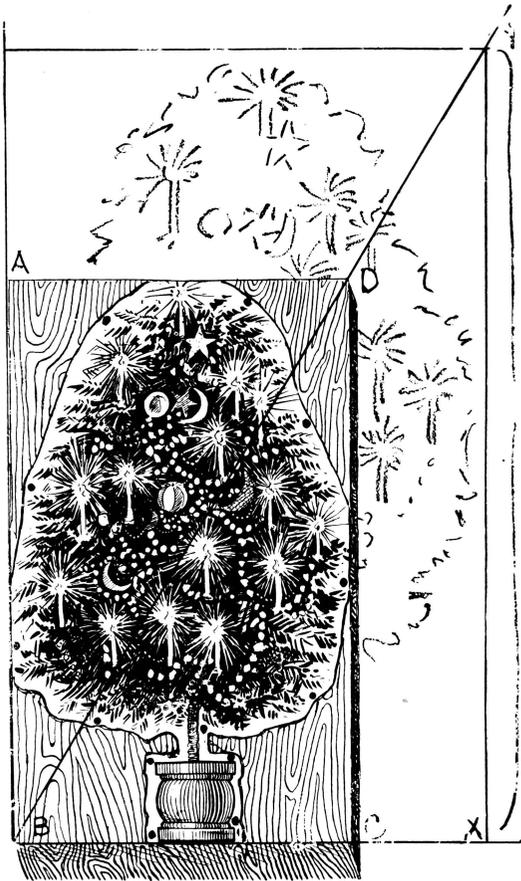


Fig. 25

Erect the perpendicular line  $XY$  to intersect the extended diagonal  $BD$ .  $XY$ , measured in inches, represents the height that must be given to the drawing.

## THE MATHEMATICAL METHOD

If the figures representing the proportion of the copy and engraving are non-fractional the problem may be calculated mathematically. If the original copy is 8 x 12 inches and the width of the plate is to be two inches, the height of the plate may be calculated thus: 8:12::2: ? The missing factor will be found to be 3.

If the engraving is 15 x 9 inches and the artist wishes to know how large to make the drawing, he must choose first some arbitrary or convenient scale of enlargement, say twice the dimensions of the plate. This would cause the drawing to be 18 inches wide (2 times 9). The ratio would be 15:?:9:18. The missing factor representing the height of the drawing will be found to be 30.

## HOW TO ORDER ENGRAVINGS

## I. Halftones.

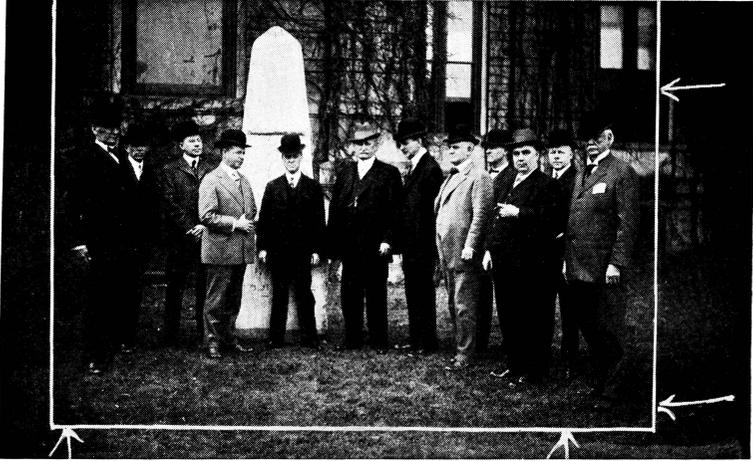
Paste a strip of paper on the upper or lower edge of photograph to be reproduced. Upon it write:

(a) Desired width of the printing surface† of engraving in inches. (Indicate specifically with arrow lines the outermost points to be included, when only a portion of the picture is desired in the finished plate. If entire copy is to be reproduced, allow marks to extend to the edge of photo.) The block will be larger, as required by the bevel for tacking.

If photograph has a margin, use the margin for marking. The grease pencil is most suitable for marking on photographs. It is not advisable to use pen and ink. When mark-

†The size of an engraving means the printing surface—not size of block on which it is mounted (although the charge is made upon size of block). Single column or smaller halftones usually are trimmed nearly flush on sides, and tacked to block on the bevel at top and bottom. Larger sizes of halftones need about one-sixth inch block margin additional to printing surface for all-around bevel and tacking.

ing on the back of an unmounted photograph use a soft pencil, being careful not to press too hard, as the lines are liable to show on the face of the picture when the negative is made.



Reduce to  
3 1/2"

120-line half tone on copper,  
Square finish without border.

Return by Apr. 2-'16  
A. R. Hilderbush,  
Columbia, Mo.

Fig. 26—Specimen copy for halftone with directions for the engraver.

- (b) Kind of screen to be used.
- (c) Kind of finish—square, outline, vignette or oval.
- (d) Indicate if special work on photo or plate is desired—"retouching" of photo; mortising or "tooling-out" on plate; special border design.
- (e) Name and address of sender.

(f) Specify time limit for return of engraving.

Mail with flat cardboard covering.

## II. Line Engravings.

Leave sufficient margin around drawing. If copy is a page of printed matter, or clippings, mount it on white cardboard. Touch with black (India) ink any gray spots on letters. Mark on lower margin in pencil:

(a) Desired width of engraving in inches. (Indicate outermost points with horizontal arrows).

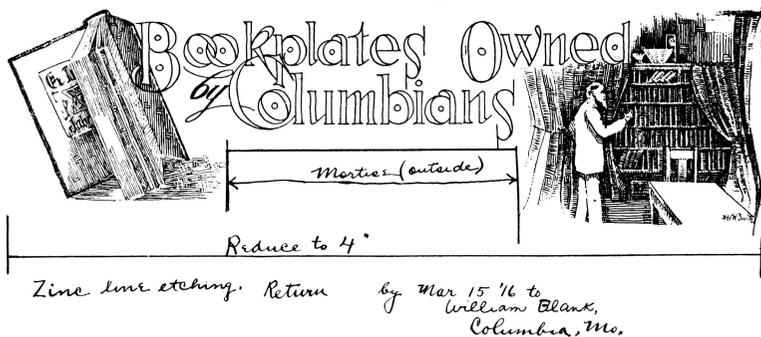


Fig. 27—Specimen copy for line plate with directions for engraver.

(b) Whether special work is desired (mortising, etc.).

(c) Name and address of sender (may be written on back of copy).

(d) Time for return of plate.

In ordering plates it is well to enclose in a separate envelope a statement confirming these instructions. If there should be anything in doubt, which may be left to the judgment of the engraver, state the problem as clearly as possible.

## ENGRAVING DEFINITIONS

Halftone, square plate—A halftone in which the outside edges are rectangular and parallel; may be with or without single black border.

Halftone, outlined—A halftone with the background out-

side of the object entirely cut away, leaving a definite edge without shading or vignetting.

Halftone, vignettted—A halftone in which one or more of the edges of the object are shaded from dark tones to pure white.

Halftone, outlined and vignettted—A halftone in which part of the background is cut away and part vignettted.

Halftone, oval—One whose outer edges form an oval.

Retouching—Brush work done by an artist on original photo copy.

Mortise—To cut out portions of a plate for insertion of type in the block.

Tooling-out—Hand-chiseling on plate to lighten the tone or to produce a white space.

Special border design—Any decorative surrounding of a picture other than straight lines.

Direct halftone—A halftone to produce which the screen negative is made by direct exposure of the article itself, and not from photograph or drawing.

High-light halftones—Also known as “facsimile” halftones, are engravings in which the dots in the high-lights are eliminated by special photo-mechanical methods, instead of by hand tooling. High-light halftones are priced at four times the Scale rate for halftones. This rate includes the necessary deep etching, routing, finishing, etc.

Newstone—Trade name applied to a halftone etched on zinc, suitable only for coarse reproduction, principally for newspaper use, with screens of 100 lines to the inch and coarser. A zinc halftone should yield at least 100,000 impressions before deteriorating. A halftone that is to be used continuously, in a standing ad, for example, should be made in copper if finer than 85 lines.

Duograph—Two halftone plates made from one copy and usually printed in black and one tint, or two shades of the same color, the two plates made with different screen angles.

Duotype—Two halftone plates made from one copy, both from the same negative and etched differently.

Two-color halftone—Two halftone plates, either (or both) an etched plate containing parts or all of the design, to be printed in two contrasting colors.

Three or more color halftones—Same as definition of two-color halftone, using three or more etched halftone plates.

Three-color process halftone plates—Printing plates etched on copper produced from colored copy or objects, to reproduce the picture or object in its original colors by a photochemical separation of the primary colors, and etched halftone plate to reproduce each separate color, usually printed in yellow, red and blue. An approximate result may be obtained from one-color copy by using the skill of the workmen in securing the color values on the etched plates.

Four-color process halftone plates—Same as the three-color process, with the addition of a gray or black plate.

Combination halftone-and-line plates, black only—Made of two negatives—one halftone and the other line—the films stripped together, and printed and etched on one plate.

Metzograph—Halftone made by the use of a grained screen instead of a cross-line screen. The picture reproduced by this screen has a pebbled softness of tones admirably suited to the interpretation of certain subjects, such as the foliage of trees, a growing crop of grain or grass, fur-bearing animals, a rough stone wall. Commercially, the screen is coming into favor for the reproduction of garments, textiles, furs, feathers, etc. When a subject demands a firm, "contrasty" treatment, the metzograph is not so good as the halftone. A metzograph plate is slightly more expensive than a halftone.

Ben Day—Name applied (from the inventor) to a mechanical shading or tinting medium. Gelatin films, upon which are various lines, dots, stipples or grains, and light and dark patterns of odd styles, are used for laying tints for one or many colors. The design for tinting is made in relief on

the gelatin film which permits its surface to be rolled with ink. The film is placed in a machine and the operator, through the aid of a stylus, transfers the design on negative, metal or drawing.

Deep etching—Additional etching made necessary to secure proper printing depth where this cannot be accomplished by routing, and usually caused by the use of dense black lines, or line negatives and halftone negatives being combined in one plate.

Reverse etching—Plate (usually a line zinc etching) in which the subject or copy is reversed from black to white or from white to black.

Embossing plate—A plate cut or etched below its surface for the purpose of raising the image of the printed surface.

Stamping die—A relief plate engraved on brass or zinc for stamping book covers or similar surfaces.

Pen drawing—Made by pen and India ink, in lines, dots or stipples, being a copy purely of black and white, to be reproduced by the zinc etching process.

Wash drawing—Made by a brush in washes with a single pigment of black or dark color soluble in water, to be reproduced by the halftone process.

Water color drawing—Same as above, made in washes with a combination of several colors. Reproduction may be by process color halftone plates or by redrawing and by combination of halftone with Ben Day line plates.

Sketch—Usually made in a rough, quick way with pencil, crayon or brush, to suggest the composition or style of a prospective drawing, to be completed later. A sketch (or "lay-out") is a preliminary to a drawing, and is rarely, if ever, reproduced direct.

Drawing—The finished work of the artist (either by brush or pen). It is the copy from which reproduction is made direct. It contains every detail desired to show in the finished photo-engraving.

Retouching—Usually hand work of an artist, or air brushing, on photographs for the improvement or change of copies, or the addition of details not shown in the original.

Air brushing—Method of placing smooth, tint surfaces on a photograph or wash drawing by an invention which blows a liquid pigment in a spray through a tool by aid of compressed air.

## ENGRAVING CHARGES

A fixed charge is made on a halftone or line engraving below a certain number of square inches in area, no matter how small may be the plate. A plate coming under this rating is called a "minimum." Beyond the minimum size, a scale rate is charged up to a size containing 100 square inches, beyond which a square inch rate is charged. Extra work, such as mortising, applying Ben Day mechanical tints, special finishing on halftones, retouching on photographs, etc., is charged on the basis of the time of the skilled employe.

Care in preparing copy may result in a saving to the user of engravings. Avoid sprawling a drawing over a large area in which much white space appears. Make the drawing compact. It may be possible then to order the engraving made smaller and save charges, if it is beyond the minimum in size. The size of the drawing, otherwise, has nothing to do with the plate charges, except in the case of copy of unusual size or character which may give extra trouble to the plate-maker.

In a series of drawings or photos, if possible, make the copy of such relative proportions as to allow the same scale of reduction for each. Try to avoid having one twice the final size, another three times, etc. Make all twice or three times the reduction size, as the case may demand. The engraver may reproduce several pieces of copy on one negative when they are of similar character and are on the same reduction scale. This helps him to keep down expense and to add to his service. In figuring the area of a plate, preliminary to

fixing charges, the engraver multiplies the greatest width by the greatest height (block measure). An L-shaped plate (one with a corner mortised out) would cost even more than if the block were left whole, because of the extra work of mortising.

The manufacturing photo-engravers five or six years ago got out of the rut in which the printing industry had been mired for years—fixing charges that had no relation to the cost of production. Through their organization, the American Photo-Engravers Association, much has been done in the way of standardization of trade terms, trade methods and trade charges.

The standard scale of prices supersedes the old incorrect square inch method, which after years of cost-findings was found to have no relation to cost of production—thus being unfair to producer and consumer. Under the old method many of the small sizes of plates sold below cost, and the profit of larger sizes was absorbed in the loss, thus making it nearly impossible to secure a just and fair average profit. The scale is based upon exact cost knowledge, and is claimed to be a scientific, correct and satisfactory gauge of values. The scale is a basis of values intended to be net, but, owing to fluctuations of costs, may have a percentage added or subtracted to secure market prices. It is a much simpler way to ascertain prices than by the old method of computation.

The following pages give the basis, formula and details of present charges.

## BASIS OF CHARGES FOR ENGRAVINGS

The basis of charges is the Standard Scale of values of Photo-Engravings, which, at present costs, is devised upon the following formula:

Square finished halftones, \$3.00 (initial fixed charge) plus 15c per square inch, up to 100 inches; 18c per square inch thereafter; minimum, \$3.75.

Zinc Etchings, \$2.00 (initial fixed charge) plus 10c per square inch, up to 100 inches; 12c per square inch thereafter; minimum, \$2.50.

It is well to keep this information in mind for practical use in the absence of a printed scale (always remembering that price is figured on base measure, which is  $\frac{1}{4}$ -inch additional to printing surface of halftones).

A copy of the scale will be mailed by any engraving house on request.

Prices do not include postage or express charges.

On long narrow plates, figure the width as one-fourth the length. (This is necessary because of waste on large negatives.)

All plates charged at block measure (not printing face). In estimating the size of halftones, add one-fourth inch to the length and width for bevel.

Unmounted plates same price as blocked.

Plates made from copy requiring a reduction to less than one-sixth its length or width, double Scale price.

1. HALFTONES—Prices are based upon reproductions made direct from photographs or wash-drawings furnished (without alterations or extra work on copy or plate), square finish, mounted on wood, block measure according to scale.  
Metal base, 15c per square inch extra. Minimum \$1.00.
2. Halftones from paintings, or direct from the object, charged extra, according to the extra time involved. (Where colored copy requires a separation negative in order to produce a suitable halftone, an additional charge is made on the basis of an isochromatic negative and print.)
3. Retouching, altering or improving copies and grouping photographs, charged as time work, and billed separately from plate charges.
4. Vignetted or outlined halftones 50% extra. (Halftones

from which all waste metal can be removed with a bev-  
eler only, are to be considered "Square" plates. All other  
are considered as "Outline" or "Vignette" plates.)

Oval finish. Finishing halftones in oval or circular  
forms 25% extra.

Hand tooling, inside cutouts, re-etching and burnish-  
ing charged extra as time work. Net.

5. Halftones finer than 150 line, 25% extra.
6. Duplicate halftones, square finish, ordered at same time  
as originals, 15% less. When duplicate outlined or vig-  
netted halftones are ordered, the 15% discount applies  
only on the basis of a square finished plate. It does not  
apply to the 50% charge for outlining and vignetting.

Example: One duplicate halftone .....	\$6.00
Discount, 15% .....	.90
	\$5.10
Outlining, plus 50% of Scale price .....	3.00
	\$8.10

7. Extra negatives for halftone groups, one-half Scale price  
(Where extra negatives are made and inserted into a  
group or combination, they should be figured at one-half  
the Scale, based on the size of the negatives after they  
are inserted.)
8. Inserting negatives and double-printing charged extra as  
time work. Net.
9. Proofs. One finished proof and one file proof are fur-  
nished with halftones and zinc etchings. Additional  
proofs 20c and 15c each respectively, on paper up to  
7x11 inches. Larger sizes, halftone proofs, 30c each.  
zinc etching proofs 20c each.  
Color process plate proofs. Three finished proofs  
and one file proof. Additional proofs 65c each.

Zinc and combination color plate proofs. Charged as time work. Net.

10. Two-color halftones, square finish, requiring color separation negatives, or from black-and-white copy to conform to color scheme furnished, seven times Scale price. Minimum charge (10½ square inch) \$32.50.
11. Three-color-process halftones, square finish, ten and one-half times Scale price. Minimum charge (12 square inches) \$52.50.
12. Four-color-process halftones, square finish, fourteen times Scale price. Minimum charge (10½ square inches) \$65.00.
13. All manipulations on color process plates aside from the reproduction of straight copy and involving hand labor, charged additional as time work. Net.
14. Three or four-color-process plates made from autochromes, 50% extra. From black-and-white copy, 25% extra.
15. Anchoring halftones on block, 35c for first anchor, 20c for each additional anchor in same block. Net.
16. Combination line and halftone plates and line etchings on copper, double halftone scale. This includes one halftone negative and one line negative (largest in each case). Additional negatives are charged according to Nos. 7 and 22. Inserting charged extra as time work.

Combination halftone and line plates on zinc, double zinc etching scale. Additional negatives and inserting charged extra.

17. Zinc halftones, 100 line screen or coarser, 25% less than copper halftones. Catalogued and sold under the trade name of Newstones.
18. Line etchings on copper, 75% additional to halftone figures on scale.
20. ZINC ETCHINGS—Prices are based upon reproductions from black-and-white line-drawings or prints furnished (without alterations to copy or plate), mounted

- on wood. Block measure according to scale. Metal base, 15c per square inch extra. Minimum, \$1.00. Line etchings on zinc heavier than 16-gauge, and up to 11 points thickness—double zinc etching figures.
21. Reproductions from lithograph or steel plate copy, script, penmanship, shorthand, scientific or other difficult copy, charged 50% extra.
  22. Extra line negatives, one-half Scale price.
  23. Inserting negatives and double printing charged extra as time work. Net.
  24. All etchings of tint and Ben Day plates, each plate 50% extra.
  25. Laying tints and painting-in color plates charged as time work. Net.
  26. All color plates to be charged at the same price as for the largest plate of the set.
  27. Reverse etchings, black to white, or white to black, mounted on wood, 50% extra. Hand tooling extra, charged as time work. Net.
  28. Mortising on wood, outside 20c; inside 30c; on metal, outside, 35c; inside, 50c. Irregular mortises 10c per corner. Net.

Mounting. All original engravings by any process are invariably mounted on wood. Plates are never mounted upon metal base unless specifically ordered that way, and for which extra charge is always made.

## ELECTROS AND STEREOTYPES

Electrotypes, or electros, are duplicates of original line and halftone engravings. An electro may usually be distinguished from an original copper or zinc plate by the greater thickness of its metal face. An electro made from a zinc line etching is usually quite successful. A halftone electrotype is successful for screen denominations up to 150 lines. It is never quite the equal of the original.

It is well to remember that since such plates are dupli-

cates they are not made directly from original copy. A wax impression of the original plate or type is placed in an electrolysis bath, where it receives a deposit of copper. This thin facing of copper is then backed up with lead and mounted on wood to form a printing plate.

The process offers the advantage of cheapness and convenience to the advertiser. A whole advertisement, including type and illustrative engraving can be duplicated in one plate by electrotyping. The process offers a distinct advantage to an advertiser who wishes to run the same ad simultaneously in several publications.

Advertisers who order signature engravings and other plates that are to be repeatedly used in the press, should be advised to include an order for electros with the original order. After thousands of impressions are made from a plate, it begins to show signs of wear by blotting or yielding indistinct lines. For every desired size of electro an original engraving must be ordered, inasmuch as the electros are made from the original engraving. Most engraving houses can take care of orders for electros along with orders for engravings by placing such orders with electrotyping concerns for the customer.

Stereotypes are another kind of duplicate of original line and halftone engravings. They are usually cheaper than electros and are inferior in quality of print which they produce.

In the process, a paper impression is first made from type matter and engravings. This impression, which is called "matrix," or "mat," serves as a mold for hot metal. The metallic impression taken from the matrix is the stereotype.

Stereotypes are a useful kind of plate to the newspaper. There are several points to be remembered by the advertiser who furnishes this kind of plate to a medium. If the publication is printed on the perfecting press using curved stereotype plates, he may send the matrix. Casting may be done in the printing plant. If a flat bed press is used and no stereo-

typing equipment exists in the plant, he should send the plate already cast and mounted.

The limit of screen fineness in a halftone that may be stereotyped is 100 lines.

\*A simple method for making mats from type that may be adapted to the needs of the small newspaper shop is as follows: place the type in a job form and lock up the form ready for the job press, or if it is large enough, place it in

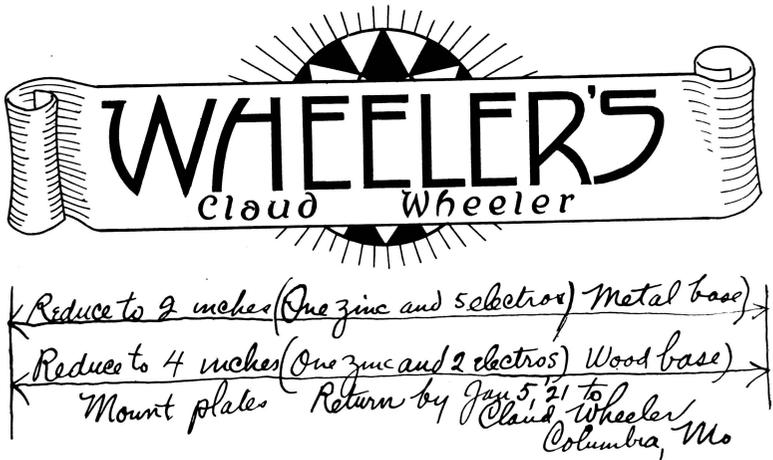


Fig. 28—Specimen copy for an order for electros.

the cylinder press. Cut a piece of good medium weight blotter paper just the size of the casting box. Place the piece of blotter on the top of the press blanket. Under the blotter place a piece of felt or any piece of rubber blanket from the press. Take the impression and the type form will be pressed into the blotter in the form of a mat. If the pressure is too great, it will crack the blotter and spoil it. If there is too little impression, the mat will be shallow and the resulting cast will smudge up between the lines of type.

\*This method is used successfully in the shop of Will Curtis, publisher of the "St. James Plaindealer," St. James, Minn.

After the casting is made the high places between the printing lines may be chiseled down. Chiseling will not be needed if, before the casting is made, bits of straw board are pasted on the back of the mat in parts corresponding to the open places in the final print.

The mats may be used for small standing ads (business cards) and for headings in the paper such as "County Correspondence," "Personal Mention," the editorial heads, and headings for the feature departments of the paper.

Better for the "home-made" mat than blotter paper is a special kind of paper which is now on the market.

## A STEREOTYPING OUTFIT FOR THE SMALL NEWSPAPER SHOP\*

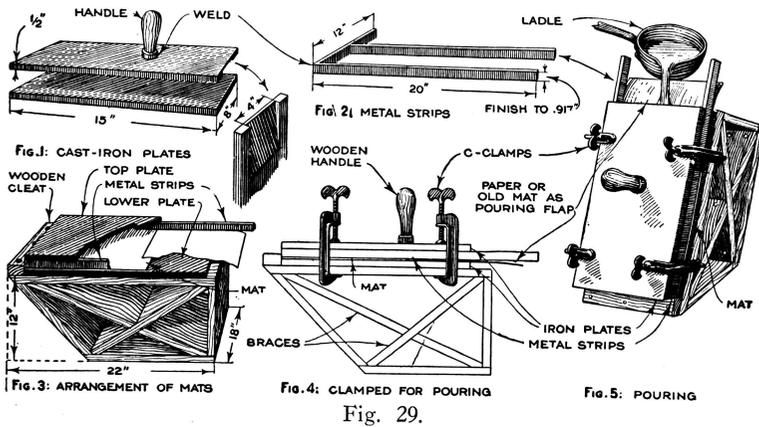
The allurement of molten linotype metal has caused many printers in country newspaper shops to experiment with stereotyping. Few who have been in the game eight or ten years have not tried it. Some results have been good, considering the crudity of means available.

\*This chapter was originally written by the author for "Popular Mechanics" and was published in that magazine in the issue of June, 1920. The illustrations, electro of which is furnished herewith by courtesy of the publisher, were drawn by staff artists of the magazine from rough sketches supplied by the author. Since the magazine article was published, some newspaper friends of the author have reported difficulty in getting plates and strips polished in machine shops. That it can be done is proved by the experience of the Columbia Evening Missourian which made and used such a casting box for more than a year. During that time several hundred serviceable castings were made. It is the opinion of the author that eventually the newspaper will purchase a commercial equipment; he does not mean to offer the above described outfit as more than a means for educating the shop staff in the elements of stereotype casting. Such an outfit is inexpensive and hence can be used to test the responsiveness of the advertisers of a given community to a mat and stereotype casting service.

Should the newspaper prefer, it can buy a small but practical casting box for somewhat less than \$50; such outfits are on the market.

The first essential is a casting box. In case of necessity, it may be made from two old mounted electrotypes, three strips of wood, and two to four clamps. This is not an outfit that will stand continued service, because of the warping of the wood, necessitating frequent replacing of parts. If metal parts are substituted, the difficulty is overcome.

With this in view, two flat cast-iron plates, as illustrated in Fig. 1, may be picked from the scrap pile of a local junk dealer. A convenient size for the making of small castings is 8 in. by 15 in.; this size will accommodate a three-column, 10-in casting. It is sometimes possible to make a heading six



or seven columns wide, in a box of this size, by casting in two parts and carefully joining the ends. The cast-iron plates should be at least  $\frac{1}{2}$  in. thick. Each should be finished smooth on one side, and polished. Attach a handle to the upper plate, consisting of an iron rod welded to it, and covered with a wooden jacket. Bevel a wide slot in one end of the same plate, this to be the "pouring" end.

The casting box is completed by the three metal strips, shown in Fig. 2, which will hold the plates apart and give thickness to the casting. At this stage it must be decided whether the castings are to be type-high or thin, in the lat-

ter case necessitating wooden mountings. The thin plate is more easily trimmed, and moreover it "ties up" less linotype metal, but it is more difficult to cast. The metal is more likely to chill while being poured, because the volume is small and the contact surfaces are close together. With such an outfit as this, therefore, it is better to make the castings type-high. For this purpose, procure three strips of scrap iron. Dress and polish them to a width of about  $\frac{3}{4}$  in. and a depth of .917 in., or .001 in. less than type-height. Weld the short strip to one of the long ones, at an angle of 90 degrees, thus making two strip units.

A stand or base for the casting box may be made from a stout wooden box, sawing thru the box at an oblique angle, indicated in Fig. 3. Remove the sides; nail a board to the sawed ends, and brace well inside. Nail a wooden cleat across the top surface near the sawed end. Lay the lower casting plate on the top surface, with one end resting against the cleat. Procure four stout C-clamps from a hardware store; for a casting box of this size only two will be needed at a time, but it is well to have two in reserve.

Cut from the sheet the desired portion of the mat, taking care to divide equally the flat depressed space surrounding the image. Cut out a piece of thin, stiff paper, having the same width as the mat to be cast. Paste it to the mat, lapping over as shown in Fig. 3. See that the paste is thoroughly dry, and then lay this mat unit on the lower plate; the paper is to serve as a pouring flap. Place the two metal strips on the depressed edges of the mat, taking care that the strips are in proper alinement with the lines of the mat image, and also that the strips do not cover any lines to be cast. See that the ends of the metal-strip units join closely, to prevent leakage of metal. Lay the upper plate on the strips, and clamp the casting box together as in Fig. 4. Tip the mounting box over on the oblique end, carefully skim the metal, and ladle it quickly, as illustrated in Fig. 5, into the open end. Good results can also be obtained by using a piece of old

mat lapped over the good one instead of thin paper, except that the pressman is then more likely to have to correct uneven thickness of the casting, by pasting paper to the back of it.

After two or three minutes the metal will have "set"; then remove the clamps, the top plate, and the two metal strips.

To insure success with the first cast, the casting box should be heated. This may be done by leaving out the mat and filling the box with molten metal. The mat should also be warmed in advance, to prevent blisters on its surface.

If an inside mortise is desired, saw an old wooden electrottype mounting to the required shape, and lay it on the surface of the mat in the proper place. Fasten with two brads, inserted from the back of the mat. After such a casting has been made, care should be exercised in loosening the mat from the wood, which is now solidly gripped by the metal. The wood may be removed with a chisel.

The most laborious part of the process—unless the shop is equipped with that very useful machine, the saw trimmer—is sawing and trimming the castings. A vise and a carpenter's handsaw will answer that purpose, as linotype metal will not dull a wood saw as quickly as one would expect. A coarse flat file or rasp will smooth the edges. It is not easy to trim the plates square unless a "shoot board," or squaring plane for wood or soft metal is provided. This may be bought from a photoengraving supply shop for \$50, or thereabout.

## A MATRIX FILING SYSTEM

Advertising illustrations are now prepared and syndicated by a number of concerns who employ artists and advertising writers. These workers, who are thoroughly trained in their specialties, furnish pictorial ideas in many lines of retail trade, thoroughly abreast of fashion and the market's trend. The illustrations are usually sent out in matrix form.

These art services are sent out once a week or once a month.

Newspaper ad managers' services may be obtained from the mat concerns. Their illustrations usually cover a variety of commodities. Specialty services for the individual merchant in a given line may also be obtained.

Matrix illustrations will be of little help to the newspaper manager unless an efficient filing system is devised. Without a system much time is lost in searching through the proof sheets, which are sent originally with the mats, for the needed picture. If the mats are piled in a corner of the office, the task of finding the mat corresponding to the proof is well-nigh hopeless and without the mat the making of the plate is impossible.

To file away the mats by months is one method that may be used. Corresponding proof sheets may be nailed to the top of a counter—perhaps two files, if duplicate proof sheets are furnished as is nearly always the case. One file should be kept intact; the other may be clipped from by the members of the newspaper's selling staff. If the date is not already impressed on the mat under each illustration, it should be written or stamped, to correspond with the date on the proofs. Inasmuch as the illustrations on the mat sheet are later probably cut apart, the necessity for the date in connection with each illustration is obvious.

At best this system is a makeshift for in time there will gather such an accumulation of mats in each monthly compartment as to compel a discarding. Of course, men's and women's fashion illustrations of last year may be discarded without hesitation, but many other designs such as hand-lettered headings and illustrations for the various specialty shops can be used again, no matter how old. Some of the larger newspapers discard ruthlessly all of last year's mats, but with the smaller paper that has perhaps only one or two services and no art department of its own a variety of subjects is desirable. How then may such material be kept without confusion?

More efficient than the plan of filing by months is one which classifies mats and corresponding proofs by subjects. Thus when the advertising salesman wishes to find an illustration of an oxford shoe, instead of looking up the proof for March or April on the supposition that files of these months *ought* to contain such an illustration, he looks up in the filing case the subject SHOES.

\*The filing case (Fig. 30) should have four drawers large enough to hold full sheets of matrices when they are placed

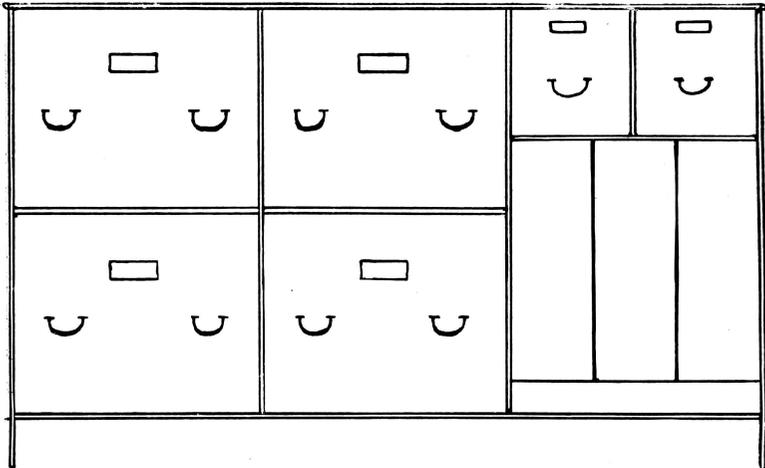


Fig. 30—The four large drawers are used for the matrices. The two small drawers (upper right) are proof files. The three compartments (lower right) are for current matrices.

on edge in the drawer, or at least large enough to hold the largest matrices in the service. One or two small drawers are sufficient to hold the proofs of the matrices that are filed.

Filing the matrices and proofs as soon as they are received is difficult because of the rush of newspaper work,

\*This represents the work of a student, Thomas B. Hammond, in the course, Problems of Advertising, in the School of Journalism of the University of Missouri.

and there are advantages to be gained by not filing them immediately. Many of the illustrations of the current and preceding month must be used immediately if at all. The newest illustrations are the ones most used and should be kept conveniently together. Again, if the matrices and proofs are filed immediately the files will be cluttered up with out-of-date illustrations, such as fashion illustrations, making frequent "house cleaning" necessary.

To keep the new matrices from being thrown about, the cabinet should contain three compartments (lower right side of Fig. 30) each large enough to contain the matrices received during a month. After they have been on hand for two months, those that are no longer useful may be discarded and the rest of them filed at leisure.

To buy guide cards large enough for the matrix file will be a needless expense. Six or eight ply railroad board can be cut to make satisfactory guide cards.

A classification of the matrices and corresponding proofs according to subjects is satisfactory but unnecessarily detailed for the small newspaper. A classification according to business and special classes is not as bulky and offers the additional advantage of putting all the illustrations for one business in one place. The following is an example of this classification:

- Agricultural Implements
- Attention Signs and Pointers
- Automobiles and Accessories
- Awnings and Screens
- Bakeries
- Barber Shops
- Banks
- Beauty Parlors
- Billiards, Pool and Bowling
- Birds and Poultry
- Blacksmiths
- Books, Stationery, Office Supplies

- Borders
- Boys' Clothing
- Cafeterias (see also Restaurants)
- Candy Kitchens
- Churches
- Coal and Ice
- Contractors and Carpenters
- Dairies
- Dentists
- Department and Drygoods Stores (see also Men's and Women's Wear)
  - Sales Heads and Borders
  - Piece Goods, Draperies and Curtains
  - Table Linen, Blankets, Bedding
  - Children's Clothing
  - Ribbons, Laces, Novelties
- Dishes and Chinaware
- Dressmakers
- Drugs
- Electrical Shops
- Fairs
- Farm Products (see also Birds and Poultry)
- Famous Men (see also Special Days)
- Feed and Flour
- Florists
- Furniture—Sales Heads and Borders
  - Porch and Wicker Furniture
  - Chairs, Tables, Office and Living Room Furniture
  - Bedroom Furniture, Cedar Chests, Mattresses
  - Ice Chests, Dining Room and Kitchen Furniture
  - Rugs and Linoleum
  - Floor Lamps, Smoking Sets and Novelties
- Furs
- Groceries
- Hardware (for Refrigerators see Furniture)
- Hotels

Ice Cream Parlors  
Insurance and Loan  
Jewelry  
Laundries, Pressing and Cleaning  
Livery Barns  
Marble Shops  
Meat Shops  
Men's Furnishings—Suits, Pants and Coats  
    Collars, Ties and Shirts  
    Underwear, Hose, Dressing Gowns, Pajamas  
    Hats, Gloves, Belts, Miscellaneous  
Millinery  
Music Stores  
Oculists  
Organizations (American Legion, Lodges, Red Cross,  
    etc.)  
Paints and Varnishes  
Photographers  
Plumbers  
Printers  
Real Estate  
Restaurants (see also Cafeterias)  
Shoes—Sales Heads, Shoe Findings  
    Men's High Shoes  
    Men's Low Shoes  
    Women's High Shoes  
    Women's Low Shoes  
    Children's Shoes  
Shoe Repairing  
Sporting Goods  
Special Days—Christmas, New Years  
    St. Valentine's Day, St. Patrick's Day  
    Easter  
    Fourth of July, Flag Day, Memorial Day, Armistice  
    Day  
    Hallowe'en

Thanksgiving  
May Day, Mother's Day  
Sales Heads  
Tailoring  
Taxicabs  
Tobacco Dealers  
Toys  
Transfer and Storage  
Wallpaper  
Women's Wear—Suits, Coats, Dresses, Waists (see also  
Department Stores and Millinery)  
Gloves, Hose, Lingerie

A classification that fits the business of one town will have to be changed slightly to be used effectively in another town.

When a large number of matrices collect behind one guide card the smaller matrices will fall down and slip under the guide cards. Care should be taken to subdivide a classification before that point is reached (see Furniture and Department Stores above.) Proper sub-classifications enable one to find a desired matrix or proof quickly. A large envelope to hold the small matrices in each division is convenient but not necessary.

THE  
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BULLETIN

JOURNALISM SERIES

Edited by

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