

Printing Processes and Their Relation to Type

The "battle of the processes" is a perennial subject for discussion and debate whenever printers get together. In this carefully condensed survey, Linotype's Director of Typographic Development emphasizes the general usefulness of Linotype composition in all three processes, with brief comments on the various technical factors that bear on the selection of faces for paper surfaces and to meet process limitations.

FOR THE PURPOSES of this Manual, there are three methods of getting ink onto paper which in the final analysis is the aim of all graphic art functions.

Specialized reproductive methods such as mimeograph, hectograph, xerography and similar methods, are disregarded.

The element which distinguishes each of these three basic processes is the ink-bearing surface. The order in which they are discussed is arbitrary. No one of the processes can be said to excel either of the others. Each is the best in certain situations; all make use of the products of Linotype equipment.

(1) Letterpress—*Relief printing from a raised surface*

THIS is the printing process originally developed with movable type in the early fifteenth century by Gutenberg from much older sources going back to ancient China and as yet unchanged in basic principle.

The raised surfaces of cast letter forms are covered with ink, which, under pressure, is transferred to paper to provide a readable or recognizable print.

A letterpress surface can be Linotype or other slugs, individual type, photoengravings or duplicate plates of this original material prepared by electrotyping, molding in plastics, stereotyping, or photoengraving.

On short run work this process is supreme and where long runs dictate the necessity for duplicate printing plates they are easily provided in this process.

The combination of rotary presses and stereotyping makes this process the fastest of the three and therefore extensively used in the production of newspapers.

Any type face can be used in this process, dependent on the paper stock required.

Letterpress is identified by impression on the reverse of a printed sheet, and by the sparkling contrast

of clean black ink with the paper. (But the perfection of the offset process often produces such crisp, sharp blacks that experienced printers have difficulty in distinguishing between the two, particularly when coated paper are used for each.)

(2) Offset Lithography—*Planographic printing from a chemically treated, level surface*

DIRECT LITHOGRAPHY (from stone or metal) is today used solely as a fine arts process and where planographic printing is discussed, offset lithography is normally the process involved.

Based on the physical fact that oil and water do not mix, this process depends for its printing surface on the preparation of a zinc or aluminum plate to receive ink where an image is desired and to repel it where white space or back-ground is required.

As in intaglio, this plate preparation can be by hand, but it is more normally effected by photomechanical means.

Three platemaking methods are possible, i.e.: albumen, deep-etch, and an electrochemical method involving bi- or tri-metallic plates prepared by deposition or etching. It is sufficient to know that these methods are listed in the order of their performance in terms of press run. The albumen plate may become defective after a run of a few thousand, while the tri-metallic plate has been used for millions of impressions.

The printing or ink-receptive image on the plate can, in this process, be line or halftone, or both, depending on the requirements of the job. The type, therefore, is not subjected to any "screening." Due, however, to the constant presence of water during the press run, a condition which tends to weaken the image, and due to the possibilities of distortion inherent in the photomechanical

cal preparation of negative and plate, certain characteristics should be avoided in the selection of type.

It should be stated first, however, that *any* type can, *with careful control and expert handling*, be used in offset. For economical production, however, the types which have strong serifs, or none, and carry lots of color, are best. These can be handled quickly and safely, even by less experienced workmen.

It is sometimes difficult to identify offset printing as such. The color of ink is the same as in letterpress, and the dot structure in halftones is also similar to that of letterpress. Absence of any impression on the reverse side of the printing is sometimes a clue, but this is not always conclusive in the face of "kiss" impressions by letterpress. One sure indication of offset is the printing of a fine screen halftone on other than coated or supercalendered paper. If the printed piece is a rough-finished stock and contains fine screened halftones it is almost without question offset. Another occasional indication of offset is "scum" or dirtying of normal white areas on the page.

Offset use is spread from the very finest of reproductive work in four and more colors to the very cheapest kind of printing by photography, from existing copy, or from such substitutes for type composition as the typewriter.

In the quality range, offset requires the use of type in order to provide a proper atmosphere to the printed piece. Offset is definitely competitive with letterpress, but in its better forms is equally a user of our product. It should never be considered as an inferior process or as a cheap substitute for letterpress.

The fact that, in offset, the printing ink is transferred from the prepared plate to a rubber surface and then to the final surface makes the process effective on all materials. Leather, cloth, tin, burlap, paper, wood, and many other materials are printed upon by offset, though sometimes by letterpress with rubber plates.

Offset platemaking requires two opposite forms of copy. In the deep etch and electrochemical processes a film positive is used. This protects the desired printing image and allows the non-printing area to be etched away. For this form of platemaking it is possible to use reproduction proofs on transparent film and so eliminate the possibility of distortion inherent in the photographing of the printed proof and the making of a contact positive from the resulting negative.

What is true of the film proof for gravure also holds true in this process. The success or failure of the plate is determined by the clarity of the type and every care should be taken to assure a satisfactory reproduction proof.

Albumen plates require negative copy and so conventional proofs on paper are needed. Exposure in a camera gives a negative to whatever enlargement or reduction is required and the only point to be borne in

mind is that photography by reflection is more productive of distortion than is the projection method and great care must be taken in providing a good proof. If possible it is well to allow for a reduction from copy size to negative size, although any considerable reduction of composed type changes the character of the type.

(3) Gravure—*Intaglio printing from an incised surface*

IN THIS PROCESS a smooth metal surface is engraved or cut into where it is desired to carry ink for transfer to paper on a press. This cutting may be done by hand as in the case of social stationery, or photo-mechanically in the case of gravure, be it sheet-fed or the more familiar rotogravure.

The hand-engraved technique in this process is rapidly becoming a lost art and as our product is not involved it receives only this passing mention.

In the photo-mechanical preparation of printing plates or cylinders for gravure the entire printing surface is broken into square dots of the same size but of varying depth. It is the depth of dot, and therefore the amount of thickness of the fluid ink resulting, which determines the tonal value of any given portion of the printing surface. Shallow dots give light tones in high-light areas, and deep dots give solid shadow tones.

In this process, as the entire area is screened, so must any type blocks used also be screened. Thus, what in other processes might be a face with bold characteristics, here may become weakened. The ink used in this process must be fluid enough to flow into the varying depths of the dot structure and to leave the level surface of the plate, where no ink should be carried, clean after wiping by the "doctor" blade. While black inks are available for gravure, the photographic qualities are sought with the brown and green colors which are characteristic of the process. They tend further to weaken the type "color." Therefore in recommending a face for use in gravure it must be borne in mind that a heavier face must be selected to allow for these "thinning" effects.

The preparation of plates and cylinders for gravure is expensive and the process is therefore used only for long runs or for cases where the soft tonal values obtainable are worth the expense. The process lends itself readily to printing on difficult materials, such as cellophane and other plastics, and is used extensively for packaging printing such as wrappers used for bread and other foods.

Intaglio printing may be identified by the raised surface of the printing. In social printing, do not be misled by the so-called process engraving which is produced by sprinkling a resinous powder over the freshly printed impression on a card and subjecting it to heat.

This kind of imitation can usually be detected by an impression of the type on the back of the card or by the fuzzy appearance of the letter under a glass.

The type blocks for incorporation into gravure forms usually come to the plate maker in the form of glassine or cellophane reproduction proofs although the more normal paper proofs may sometimes be accepted. It will be found that in the preparation of gravure proofs where makeready is impossible due to the surface on which the printing must be done, slugs cast from worn or defective matrices, or on machines out of adjustment, cause considerable difficulty. However, before assigning the cause of poor reproduction proofs to matrices it is essential to eliminate the possibility of machine troubles, ink and proof press adjustments.

Gravure printing can be identified by the characteristic solvent smell of ink, as well as the sepia and greenish tones often used in one-color work. Under a glass, gravure appears as an all-over pattern of small square dots of the same size. These can best be seen in highlight areas. The screen texture can usually be noted in any type matter that is in gravure.

It is perhaps in letterpress that the greatest care is necessary in the specification of types. Paper stocks available range from spongy antique book papers, which thicken types appreciably, to hard-surfaced coated stocks which reveal every finicky characteristic of the letter. Probably the first fact to be determined in

the recommendation of a type face therefore is what paper is to be used.

Printing in color also has a great bearing on type specifications. If Spartan Light is to be used in black, use Medium for a red, and Heavy for a light green.

The information given above in regard to paper and color applies equally to all three processes. In the last two paper stock is not as important, but it is a definite factor.

Study of the table appended, in conjunction with the specimen book will reveal the basis of type selection. The list is not complete but is a guide to the problem. Papers shown for gravure printing would normally be restricted to the sheet-fed process, used for shorter runs of fine book illustrations and such high-grade work. Rotogravure demands special, highly calendered light-weight papers whose surface would carry any kind of type except that the gravure screens are so detrimental to type.

In the first example below the amount of letterpress impression required to overcome the rough texture of the paper will thicken the type. In the offset there will be no thickening, so start with the required weight. In gravure the type will be weakened by screening, so allowance must be made by use of a heavier face.

In the last example no impression is allowable, so for both offset and letterpress use the required weight of the type face.

PAPER FINISH	LETTERPRESS	OFFSET	GRAVURE
Eggshell	Bodoni Book	Bodoni	Bodoni Bold
Antique	Caslon Old Face	Caslon 137	Caslon 2
Machine Finish	Spartan Book	Medium	Heavy
English Finish	Fairfield	Fairfield	Fairfield Medium
Process Coated	Caledonia	Caledonia	(No use of Coated)
Coated	Bodoni Book	Bodoni Book	(No use of Coated)

Technical Terms You May Encounter

THE IMPACT of the photomechanical processes has brought a considerable enlargement of our normal Linotype field vocabulary. The following brief glossary includes process terms which may be encountered (*and should be understood*) in talking with customers about the reproduction of type. Omitted are the more generally used terms of the composing room and the names of various machines now in use or development—all such as are part of our daily language.

Acetate proof—See *Transparent Impression*.

Actinic—(Photography) The portion or colors of light that can expose photographic materials.

Airbells—(Photography) 1. Small bubbles in the film emulsion of film base. 2. Air bubbles that adhere to the film during development. If they are not removed, small, clear, undeveloped spots may result in the image.

Autopositive—(Photography) A duplicate positive film or paper print made from a positive (or a negative from a negative). This can be produced by using "autopositive" materials or by *Chemical Reversal*.

Bleed—(Photography and Stripping) Enlargement of the borders of an illustration so that after printing and trimming to size, the desired margins will be flush with the edge of the sheet or page. (Photography) Enlargement of character or detail size so that its margins will extend under adjoining printed matter. See *Spread*.

- Blind**—1. (Photography) Fine line or halftone detail on negatives or positives that have insufficient density to hold back *Actinic* light in contact printing or photo-mechanical platemaking. 2. (Litho platemaking) Printing detail on the pressplate that will not accept ink. See *Walk-Away*.
- Blowup**—(Photography and Litho platemaking) An enlargement of text or illustrations and its printed reproduction.
- Blueline**—(Copy preparation and Stripping) Photographic blueprints made on drawing paper, plastic or glass sheets from a *Key*. Bluelines are usually made in sets for the number of colors to be printed. They serve as outline guides for drawing in color separation detail and for stripping films to their design. The bluelines do not print in photography or platemaking.
- Border**—(Copy preparation or Stripping) Finishing line or design drawn around an illustration in copy preparation, or later engraved in the negative.
- Brighttype**—(Trade name) A commercial method for producing a positive film of type composition by photographing directly from the type form.
- Bromide Print**—A photographic print, usually an enlargement, made on a silver bromide sensitized paper.
- Brownprint**—(Stripping) A photographic proof made from a negative, or a negative *Flat*. Used for proofreading, checking lay or page imposition. Also called "Silverprint," "Van Dyke."
- Burnishing**—(Copy preparation) The pressing down of paste-up material under protective paper on tissue to insure its firm adherence to base.
(photoengraving) The corrective treatment of a plate with a burnisher to darken local areas.
- Chemical reversal**—(Photography) Converting a negative to a positive (or vice versa) by chemically treating the photographic image during development.
- Choke**—(Photography) Sharpening up of line detail, usually of display matter. Produced by diffused contact printing methods. Used to provide color overlap in printing. See *Spread*.
- Clearing**—(Photographic) Removal of veil, fog, scum or stains from photographic negatives or prints.
- Cold-type**—(Composition) The preparation of text and display composition through use of typewritten, phototypeset, hand-lettered or other assembly of characters, for photomechanical reproduction; without the use of "hot" metal type. See *Photocomposition*.
- Combination**—(Photography) Line and halftone printing subjects combined on a film. (Platemaking) two or more different printing forms combined on the same press plate (as differentiated from *step-and repeat* or multiple prints of a single subject).
- Complementary**—(Stripping) A pair of flats that complement each other. Each carries part of the printing detail and is combined with the other by *Double Printing* in platemaking.
- Comprehensive**—("Comp") See *Layout*.
- Contact**—(Photography) A print on any photographic material made by exposure in contact through a negative or positive.
- Contak**—(Copy preparation) (Trade name) A method of applying texture patterns to areas on copy using an opaque pattern printed on adhesive film.
- Continuous tone**—(Photography) A photographic reproduction in which the image density varies continuously between different shades or tone values. The image is converted to a halftone through photographing with a screen to permit printing by letterpress or lithography.
- Contrast**—(Photography) Relative separation of lighter and darker tones between the copy and the reproduction. "High contrast" refers to a noticeably increased difference between two shades of gray or color.
- Copy**—1. Manuscript or text furnished to the printer. 2. Photographs, art work, printed proofs, or paste-ups furnished for reproduction by printing. 3. A photographic duplicate.
- Copyboard**—(Photography) The component of a process camera that holds the copy in a flat plane for photographic reproduction. Various copyboard constructions include wood, glass covered, transparency, vacuum, and suction.
- Copy Scaling**—(Photography) Determining the reproduction ratio required between the copy and the printing size. Marking this ratio, or equivalent dimensions, on the copy.
- Correction**—(Typography) Replacement of incorrect characters or slugs in a body of composition. (Copy preparation) Replacement of sections of copy by cutting out incorrect matter and insertion of new sections of copy by paste-up methods. (Stripping) Similar to copy corrections except that operations are conducted with film or stripfilm.
- Coxhead Liner**—(Trade name) A photoletering machine for producing display type matter on photographic film or paper strips. Uses hand positioned matrix discs. Each disc carries a font of characters.
- Craftint**—(Copy preparation) (Trade name) A method for introducing screen textures in illustrations either by applying a textured adhesive film or by developing up such a texture on specially prepared art boards.
- Crop**—(Copy preparation and stripping) To trim away, mask out, or indicate superfluous illustration margins of copy or films. Cropping is used to adjust the pictorial values of an illustration, or to modify its proportions so that it will fit within the space it is to print.
- Crop Marks**—(Copy preparation) Markings placed at edges of illustrative copy to indicate the area desired in reproduction.
- Cutting**—1. (Photography) Chemical etching of photographic negatives or positives to reduce density, sharpen up (on positives) or thicken printing detail (on negatives); or reduce halftone dot sizes. 2. (Copy prepa-

ration) The cutting apart of photocomposition on paper and reproduction proofs with scissors or paper knives preliminary to pasting same up on the positive. 3. See *Trimming*.

Dark Reaction—(Photomechanical) The progressive increase of insolubility of a sensitized photomechanical surface with time and without exposure to actinic light.

Darkroom—(Photography) An enclosed room free from actinic light in which photographic operations are conducted. The darkroom usually adjoins the process camera.

Darkroom Camera—A process camera having its rear section built into the wall of a darkroom. This permits direct access to the camera back for placement of photographic materials without the need for individual film or plate holders.

Deep Etch—1. In lithography, a platemaking process in which the ink-receptive areas are slightly etched below the surface of the plate. 2. In photoengraving, additional etching of open, non-printing areas of the plate to improve printing properties and reduce routing.

Definition—(Photography) A measure of the resolving power of acutance of a lens in terms of its ability to sharply define photographic detail.

Densitometer—(Photography) An instrument for measuring the local density of images on photographic negatives, prints and transparencies.

Density—(Photography) A measurement of the degree of opacity of a photographic image to the transmission of light. Density measurements are logarithmic in scale.

Developer—(Photography) A chemical solution that converts the exposed image areas on a photographic film or paper sheet into silver deposits whose density is proportional to the relative exposure. Developers are reducing agents that act selectively on the latent image areas of the photographic emulsion.

Development—(Photography) The conversion of the latent (invisible) image on a photographic emulsion through action of a reducing agent or developer. (Photomechanical Platemaking) The removal of the soluble bi-chromated colloid from the unexposed areas of the press plate to produce a photomechanical printing surface.

Diaphragm—(Photography) A lens aperture or stop that limits the amount of light transmitted through the lens. See also *Iris Diaphragm*.

Diazo print—(also "Whiteprint," "B&W," "Ammonia Process," etc. Trade names include OZALID, BRUNING, ETC.). (Proofing). A direct positive print made on a diazo dye-sensitized paper from a positive film make-up or a stripped-up positive flat. Also used to provide the equivalent of galley proofs from photocomposition on film. Similar to *Brownprints* in function.

Dimension Marks—(Copy Preparation) Short lines ruled on the margins of the copy (frequently coinciding with the trim marks) to which the final printed reproduction

size is noted. These marks guide camera settings in photography.

Distortion—(Photography) Change of shape or proportions of an image due to imperfect camera or lens conditions. Controlled photographic distortion to fit copy into a non-proportional area is frequently called "*Modification*."

Double-printing—(Photography and Photomechanical platemaking) To build up the printing design by combining detail from two (or more) negatives. Exposures are made successively in register in adjacent areas on a light-sensitive surface. See *Complementary and Surprinting*.

Dry Relief Offset—(High-etch) Relief press plates made for use on offset lithographic presses and printed from without the use of dampeners and water. The plates are prepared by photomechanical process and the non-printing areas are etched from .008 to .015 inches below the plate surface.

Dummy—(Copy preparation) A preliminary layout showing the appearance of the completely printed product. Usually prepared to final size using specified paper stock, folds, and binding. The location of display and body text, and illustrations are sketched in the positions they are to occupy.

Engraving—1. (Stripping) Scribing rules and borders into line negatives through use of an engraving tool ("Needle"). The tool removes a thin layer of the blackened emulsion and produces transparent printing lines. 2. Any original relief printing plate produced by etching, hand tooling or machine engraving. 3. Brief for *Photoengraving*.

Enlargement—(Photography) A reproduction larger than the original copy.

Exposure—(Photography and Photomechanical) Subjecting a light-sensitive material to the action of *actinic* light. "Correct exposure" is the combination of light-intensity and exposure time that is sufficient to produce the desired properties in the completely processed material.

"f"-Numbers—(Photography) The numbered divisions on an iris diaphragm of a lens used to indicate the amount of light transmitted for photography. The f/numbers (such as f/8) represent the ratio of the diaphragm opening to the focal length of the lens.

Face—1. (Photography and Photomechanical) The sensitized or emulsion surface of a photographic material or a photomechanical printing plate. 2. *Typography*. Brief for typeface.

Fast-etch Plate—(Photoengraving) A relief printing plate prepared by photomechanical process and etched to printing depth in one etching operation. Usually prepared with magnesium alloy ("Dow-etch") or zinc metal. The fast-etch process permits *cold-type* composition to be effectively used on letterpress.

Film—(Photography) A thin sheet of transparent plastic material coated with a light-sensitive emulsion. When the film is exposed, developed, and processed, it be-

comes a *negative* or *positive* of the printing subject.

Fixation—(Photography) The chemical conversion of the unexposed and undeveloped silver salts in the photographic emulsion into a water-soluble form, so that they can be washed away. The common ingredient of a fixing solution is sodium thiosulfate or "Hypo."

Flat—(Stripping) An assembly of film negatives or positives, stripped or taped into position on glass, plastic sheets or goldenrod paper, and used for preparing printing plates by photomechanical processes.

Fluorescent white—A special fluorescent pigment for painting highlights on photographs and wash drawings. The pigment reflects ultraviolet light from camera lights and with the use of filters produces pure white areas without screen in the lithographic negative.

Focus—(Photography) The point at which the rays of light transmitted by a lens converge to form a sharp image of a corresponding detail point in the copy. A camera is said to be "in focus" when the maximum overall sharpness of image *definition* is obtained for the entire copy area.

Fog—(Photography) A thin undesirable veil of uniform density over part or all of the surface of the developed photographic material. May be due to exposure to light other than that forming the image, to lens flare, aged materials, chemical impurities or other causes.

Gallery—(Photoengraving) The photographic department of a printing plant.

Gamma—(Photography) A measurement of the ratio of contrast between shades of gray in the photographic reproduction as compared with the copy from which it is made. A gamma of 1.0 indicates equal contrast values between the copy and the reproduction. A gamma such as 7.0 shows that a very high contrast will be produced in the reproduction.

Gang Negative—(Photography) A negative bearing a number of duplicate images, produced either from a paste-up of duplicate prints, by stripping together duplicate negatives, or by multiple exposures from a single negative on a plate or film. Also called "Group Negative." See *Step-and-Repeat*.

Gang Plate—(Platemaking) A printing plate bearing a number of duplicate printing forms as an integral unit. See *Gang Negative* and *Step-and-Repeat*.

Grain—1. (Photography) The distribution of silver particles in photographic emulsions and images. "Fine grain" indicates that the particles are relatively small and will not roughen the edges of printing detail reproduced by photomechanical processes. 2. (Lithography) The surface texture applied to press plates to improve printing qualities and durability of the printing image.

Gripper—(stripping, platemaking and press) The mechanical fingers on the press that hold the paper sheet for feeding and printing. Hence the edge of the *flat* or pressplate corresponding to the gripper edge of the sheet. "GRIPPER DISTANCE" is the allowance on the flat (and press plate) for the clamping of the press plate

plus the non-printable paper margin required for the press grippers.

Groundglass—(Photography) A sheet of glass ground to a matt surface and mounted in the camera so that the image of the copy can be focused on it and inspected before it is exposed to a photographic material.

Hadego—(Trade name) A photoletering camera in which the characters are hand set in a stick and photographed a line at a time on a sheet of film. Enlargements and reductions are obtainable.

Halftone—1. (Photography) A photographic negative or positive made from continuous tone illustrative copy in which the printing elements are broken up into uniformly spaced dots. The individual size of each dot is proportional to the amount of ink to be printed in its location in the printing design. 2. (Photoengraving) A relief halftone printing plate.

Highlight—(Photography) The lightest or whitest areas of an original positive, or reproduction. Also the densest portion of a continuous tone or halftone negative. A "Highlight Negative" is one in which the highlight dots have been closed up ("plugged or fogged") so that they will not print.

Humidity Effect—The influence of changes of relative humidity on the size and register of photographic films, paper, flats and press sheets. Most organic materials such as paper and film expand in size upon absorbing moisture.

Hygrometer—Instrument for measuring *relative humidity*.

IBM—(Trade name) A typewriter machine which provides for proportional spacing and right hand justification of lines, used for "cold-type" copy preparation.

Imposition—(Composing) The assembly, arrangement and securing the pages, sectional forms or signatures in correct location for printing.

Inking in—(Copy preparation) Drawing of line printing detail on a photograph or blueline print. The photographic image is later bleached out, leaving only the inked design for reproduction. Also used for preparing pre-separated color copy.

Insert—(Paste-up and stripping) A small block of copy to be located within the printing form by paste-up methods on the copy, or by stripping-in on the flat.

Iris Diaphragm—(Photography) In a lens, an adjustable diameter opening to control the quantity of light transmitted for exposure. Usually consists of overlapping vanes actuated by a ring around the lens barrel.

Justification—(Typography) In composition of type matter, the adjustment of inter-word or inter-character spacing so that each full line of type will exactly fill the specified measure (or body area). Justified cold-type composition is similarly adjusted so that both right and left hand margins of a column of text are aligned.

Justewriter—(Trade name) An automatic justifying typewriter consisting of a keyboard "Recorder," and a typewriter "Reproducer." Operation of the Recorder produces a perforated paper ribbon into which justifica-

tion perforations are added upon completion of each line. The paper ribbon is then fed into the Reproducer that automatically produces page or roll lengths of justified typewritten composition. Used for preparation of paste-ups in *cold-type* composition.

Key—(Copy preparation and stripping) An outline drawing used for positioning the printing elements. The key may serve to guide in the assembly of copy or films by superimposition. Or duplicate photographic prints as *bluelines* may be made from the key, on which the copy or films are assembled.

Latent image—(Photography) The invisible image retained in the photographic emulsion after its exposure to light. *Development* acts selectively on the latent image to produce a visible photographic print.

Lateral Reversal—(Photography) Inversion of the reading direction of printed matter. Obtained by optical reversers attached to the lens; by contact printing through the back of the film; or by "flopping" a film in stripping.

Layout—(Copy preparation) 1. A rough outline prepared to scale and showing the general appearance of the job to be printed. A "Comprehensive" layout is more fully detailed. See *Dummy*. 2. (Stripping) An exact outline or centerline drawing on paper or film to which the negatives or positives are positioned and attached to each other.

Lens—(Photography) An optical instrument consisting of two or more curved glass elements mounted in a barrel, and used for photography on a camera. The lens collects light received from illuminating the copy, and projects this light so that it forms an image of the copy on the photographic material.

Letterpress—Printing from type and plates that have a relief printing surface (raised above the non-printing body support). Differentiate from *lithography* where chemical surface treatment defines the printing areas; and *gravure* where the ink printing design is formed of minute inkwells below the cylinder surface.

Light table—(Copy preparation and stripping) A glass-topped table illuminated from underneath. Used for layout work, stripping, opaquing and other operations requiring viewing the images by transmitted light.

Line Engraving—1. A printing form prepared with engraved or etched lines in relief as distinct from halftones. 2. (*Photoengraving*) A printing form prepared by *photomechanical* process from *line copy* without the use of a halftone screen.

Line Negative—(Photography) A photographic reproduction of line copy on a high contrast film or other material. (Line copy consists of rules, type matter and other solid ink printing designs.) Line negatives have clear transparent lines or designs in an opaque background, so that light will pass only through the transparent areas when used for platemaking. Differentiate from *Halftone* negatives and *Continuous Tone* negatives.

Line Strip Punch—A (Fotosetter) correction device with locating pins for the register holes and a dial for adjusting the pins to type size and line spacing. When the punch is operated it cuts out the original line and the corrected line to exactly the same size.

Lithography—A printing process in which the printing design on the press plate differs chemically from the non-printing areas. The printing design attracts greasy ink while the surrounding areas of the plate, when dampened, repel the greasy ink. The printing design may be hand drawn or prepared by *photomechanical* methods. See *Letterpress*.

Markup—(Copy preparation) The detailed instructions for the length of lines, size and face of type, spacing and positioning of any illustrative material as marked on the copy to guide in its reproduction.

Mask—1. (Stripping) To cover or block out areas of photographic films or stripped-up flats, with orange, red, or black paper, metal foil, or plastic tape so that they will not be reproduced in platemaking. Also bordering illustrative copy or negatives to limit their printing area. See *Crop*. 2. (copy preparation) A red or black paper or film cutout attached to copy in spot locations to reproduce as clear film areas on a photographic negative. This aids stripping-in of illustrations or text.

Mechanical—(Copy preparation) See *Paste-up*.

Multiple Negative—(Photography) See *Gang Negative*.

Negative—(Photography) A photographic film or other material that is exposed and processed to provide a reversal of the lights and shadows as they appear in the copy (i.e. white areas are recorded as black, and black areas develop up clear on the negative).

Offset Lithography—"Offset" An indirect printing method from a correct-reading lithographic printing plate in which the inked impression is first applied to a rubber blanket that in turn transfers or "offsets" the ink on to the sheet of paper or other material. Printed on an "Offset" press.

Opaque—(Photography and Stripping) Any material or photographic image whose color or *Density* prevents the passage or *Actinic* light. "Opaque" is also a liquid ink that is applied by pen or brush to negatives and positives to mask out and prevent the light from passing through specific areas in platemaking.

Opaquing—(Stripping) The application of *opaque* to negatives and transparencies. "Blocking-out."

Original—(Copy preparation) The photograph, drawing, painting, design, print or other matter submitted for *photomechanical* reproduction; usually referred to as "copy."

Overlay—(Copy preparation) 1. A sheet attached to copy detailing special instructions that apply to the arrangement or reproduction of the printed job. 2. A translucent film attached to the copy that carries additional detail to be reproduced in printing. Also as transparent color separation drawings for simple multi-color reproductions.

Paste-up—(Paste makeup) (Copy preparation) An assembly of pieces of art, reproduction proofs, photographs, cold-type and photocomposition, etc. that are prepared to scale and are pasted in position on a paperboard mount. Rules, borders, art work and instructions are added to complete it for use as *Copy* in photomechanical reproduction. Also called "Mechanical."

Pegboard—(Stripping) A device for the rapid assembly of films to standard form layout, such as in signature imposition in publication work. Each film is perforated with two or three holes that are referenced to the printing detail. These films are then mounted on the locating pins on the pegboard. When the assembly is complete, the films are taped to for a *Flat*.

Photocomposer—(Platemaking) A machine for the accurate positioning and exposure of positives or negatives on a sensitized photomechanical press plate. The equipment usually includes "Chases" or "Negative Holders" and a "Register Device" so that the positive or negative can be pre-positioned before being attached to the machine. If a single subject is exposed repeatedly on the press plate to produce a "Multiple," "Group," or "Gang" assembly, the product is frequently called a "Step-and-Repeat" Plate. Accordingly the machine is also referred to as a "STEP-AND-REPEAT MACHINE." When different printing subjects are combined on a press plate, the product is called a *Combination* plate. NOTE: Differentiate from *Photocomposition*.

Photocomposition—The photographic preparation of printing text, display and other type matter for use in producing photomechanical printing plates. Photocomposition includes both *Phototypesetting* and *Photolettering*.

Photoengraving—A relief printing plate prepared by *photomechanical* means.

Photography—(Literally—"writing with light") The use of light to produce an image of itself on a light-sensitive or photographic surface.

Photolettering—(Photocomposition) The photographic preparation of printed words by manually positioning the mat of each character for exposure. Photolettering is usually limited to display composition. Exposures are made either on paper for *Paste-up* use, or on film for assembly by *Stripping* methods.

Photomechanical—The use of photography to produce a printing surface. Based on the ability of *Actinic* light to directly or indirectly (with *Development*) change the physical properties of a light-sensitive surface, such as its solubility in water. A mechanical differentiation of the surface is obtained that can be used directly to accept ink as in *Lithography*, or that can be further etched to produce relief plates for *Letterpress* or intaglio surfaces for *Gravure* printing.

Photomontage—(Copy preparation) The combination or blending of several photographic images into a single print to present a variety of related views or subjects.

Photostat—(Trade name) "Stat"—1. A rapidly made correct-reading paper negative print of copy. 2. The camera

equipment used to produce "Photostats."

Photo Proof—A type of reproduction proof.

Phototypesetting—(Photocomposition) The photographic composition of text matter on photographic film or paper. Produced by operation of a keyboard on a phototypesetting machine.

Phototypography—(Photocomposition) The art of photocomposition as it relates to the design and fitting of characters, the harmony and balance of the assembly of characters as text, and the achievement of its over-all function for readability, attention, record, atmosphere or mood.

Pinhole—(Photography) Minute transparent spots occurring in the developed photographic negatives. May be due to dust or chemical impurities. See also *Airbells*

Planograph—Printing from a plane or flat surface. Sometimes used as a synonym for offset lithography.

Platemaking—(Photomechanical) The production of a printing plate by photomechanical processes. In lithography, this includes the preparation, sensitizing, exposure, processing and finishing operations to prepare the plate for the press.

Positive—(Photography) A photographic reproduction on film, plate, or paper whose density values directly approximate the proportional light intensities reflected from the original.

Print—(Photography) The duplication of a photographic image by exposure in contact. Exposures may be made from negatives or positives on sensitized paper, film, or metal sheets.

Printing Frame—(Photography and platemaking) A pair of attached frames, one carrying a clear glass and the other a pressure blanket. They are used to enclose a photographic negative or positive and a sensitized material, and to hold them together in firm contact for exposure to light, when making *Contact* prints.

Progressive Proofs—"Progressives," "Progs") A series of proofs made from color process plates, that show the individual color printings; the color sequence in printing; and the color combination as each additional color printing is added.

Proof—Trial impressions taken from a negative, positive, or flat, or pulled from a printing form at various stages of printing production. Used for proofreading, corrections, revisions, etc. May be qualified for a particular production stage such as "Galley Proof," "Press Proof," etc. See also *Progressive Proofs*, *Reproduction Proof*, and *Brownprint*.

Proportion—(Copy preparation and Photography) The dimensional ratio between any two subjects, such as that between copy and its photographic reproduction. May be expressed in fractional units or in percentages.

Reduction (of Density)—(Photography) 1. A decrease of Photographic image density, usually by chemical etching. 2. Size reduction obtained through photography on a camera.

Reflex (Prints)—(Photography) Photographic contact prints made by exposure through the back of the sensitized film or paper sheet. The light passing through the photographic film or paper to the copy is reflected back by the copy in proportion to its local brightness. The Total image exposure is the sum of the transmitted and reflected light intensities.

Register—1. Exact agreement in position of printed matter on both sides of a sheet, or on pages of a book. 2. Exact overprinting of two or more color plates so that the printed detail is correctly combined. May be indicated by exact superimposition of the "Register Marks" printed with each color impression. 3. In *Flat* preparation exact agreement between a set of color or complementary flats.

Reproduction Proofs—"Repros" (Copy Preparation) A corrected and accurately printed proof of type composition for use as camera copy or for paste-ups in copy preparation.

Resolving Power—(Photography) A measurement of the ability of a lens to separate fine detail in the image it forms. Also the ability of the photographic material to record such detail. Measurements are usually rated in lines per millimeter. In photomechanical work where both the resolving power and definition contrast are important, the term "Acutance" is preferred.

Retouching—(Stripping) Correcting defects and blemishes in the photographic image on negatives or positives. Also includes spotting out of pinholes, airbells and other photographic defects.

Reversal—1. The production of photographic positive from positive copy by chemical treatment during development to provide a positive instead of a negative. 2. Lateral inversion of the optical image by the use of a prism or mirror in front of the lens, or by exposing through the back of the film.

Reverse Plate—(Stripping and Platemaking) A printing plate in which the typography or illustration will print in reversed color to the copy; for example, with white text in a black printed background.

Ruling—1. (Copy Preparing) Drawing of rules, lines, and borders on the paste-up or copy so that they will reproduce in printing. Differentiate from *Lithographic Engraving* where the rules, etc. are later scribed into the blackened negative emulsion. Rules may also be drawn on positive films. 2. (Bindery) Inking lines on paper with a ruling machine for blank book, ledger or other forms. 3. (Electrotyping) Engraving ruled lines on a wax-coated metal plate ("case") and then preparing the printing form by electrotyping methods.

Safelight—(Photography) A darkroom lamp that is screened with a selected colored filter. The color is chosen so that the light will be relatively non-actinic to the photographic materials in use.

Scale—(Copy preparation and Photography) 1. The specified ratio of enlargement or reduction required to reproduce the copy to printing size. The fractional or

percentage scale is frequently marked on the copy in place of *Dimension Marks*, i.e. "½-scale"; ".75 reduction"; "same size"; "2x scale" etc. 2. To proportion or compute measurements in copy preparation so that all the printing elements will fit and agree with each other after photography.

Scale Focusing—(Photography) Using location measurements as marked on a chart or graduated in a scale to set the camera components to the required reproduction ratio; instead of focusing the image on the ground glass.

Shading Sheets—(Copy preparation) Overlay films printed with various textures, usually backed with wax or other pressure-sensitive adhesives. They are attached to line copy and trimmed to size so as to add uniform tint values to specified areas.

Sheetwise—(Layout and Stripping) A printing layout requiring two different forms, one for printing the front and the other for printing the back of the press sheet. Differentiate from *Work-and-Turn* and *Work-and-Tumble*.

Shingle—(Copy Preparation) An assembly of individual overlapping printed or typewritten cards (such as directory entries) that are used as copy for photomechanical reproduction. Revisions and new entries are inserted in position.

Signature—(Layout and Stripping) 1. A printed sheet consisting of a number of pages that is correctly folded to form a section of a book. (i.e., as a 16 or 32 page signature.) 2. A letter or figure placed at the bottom of the first page of each signature to guide in folding, gathering, and binding of the book.

Silverprint—See *Brownprint*.

Sketch—(Copy Preparation) A rough outline drawing of the proposed printed job that suggests its layout and composition. Also called a "visual" or "Rough." See *Dummy and Layout*.

Soft—(Photography) 1. A photographic image of low contrast. 2. Photographic detail with poorly defined outlines between printing and non-printing design areas. Also called "vignetted edge," "fuzzy," "halo," "unsharp," etc.

Spotting—(Stripping) Retouching spots, pinholes and other small defects in negatives or positives so that they will not reproduce in printing. See *Retouching*.

Spread—(Photography) A thickening of line detail, usually of display matter. Produced by diffused contact printing. Used to provide color overlap or "bleed" in multi-color printing. See *Choke*.

Step-and-Repeat—(Platemaking) See *Photocomposer* also *Gang*.

Stop—(Photography) A specified size of *diaphragm* opening in a lens.

Straightedge—A device for holding a ruling pen attached to a sliding carriage.

Stripfilm—(Photography) A thin photographic film attached to a temporary film or paper support for exposure and

processing. For use the strip-film membrane is stripped off its temporary support and cemented in place on another film or glass flat.

Stripping—1. (Photomechanical) Combining negatives or positives together for page or form make-up, to produce a *Flat* for photomechanical plate-making. Stripping includes both the method of transferring *Stripfilm* membranes to new films or flats; and the splicing together of photographic films (or paper negatives), such as with the use of pressure sensitive tapes. 2. (Photography) Removing of photographic image sections of the emulsion from dry plate, wet plate or film and transferring them in position to a new transparent support. 3. (Lithography) A press difficulty in which steel distributing rollers fail to accept ink when the roller surface becomes water receptive. 4. (Electrotyping) Removing the shell of the printing form from the mold after it has been formed by electrodeposition. 5. (Plastic molding) Removing the plastic printing plate from the matrix in which it was formed. 6. (Gravure) Removing the electrodeposited printing shell from the gravure cylinder after completion of its use for printing to permit the reuse of the cylinder.

Surprinting—(Photography and Platemaking) Combining printing detail within an area on films or in plate-making by successively exposing two or more negatives in register on the same light-sensitive surface. Also called "Overprinting." Differentiate from *Double Printing*.

Tint—(Copy preparation, photography and stripping) 1. A shaded effect produced by closely spaced fine lines, textures, or halftone dots of uniform tone value. 2. Sheets of film provided with such textures. See *Shading Sheets*.

Transparency—(Photography) A positive photographic image on a clear or transparent support. Frequently, a "Color Transparency."

Trimming—1. (Copy preparation) The cutting away of surplus paper from reproduction proofs and illustrative material in the preparation of paste-ups. 2. (Stripping) The cutting away of excess film from negatives or positives.

Transparent Impression—An ink proof taken from type forms and made on clear acetate or other film. Used as a *Positive* in photomechanical platemaking; as an *Overlay* on camera copy; or for making contact negatives. Also called "Acetate" or "Celluloid" proofs.

Vacuum Makeup Table—A translucent top table illuminated from beneath and provided with grooves or other vacuum openings for holding film flat by suction so that it can be accurately assembled into form makeup.

Vacuum Printing Frame—(Photography and Platemaking) A *Printing Frame* in which contact pressure for exposure is obtained by exhausting the air within the frame with a vacuum pump.

Vandyke Print—(Proofing) See *Brownprint*.

Velox—(Trade name) 1. A photographic contact printing paper. 2. In copy preparation, frequently a line or halftone print used in paste-ups. This permits line photography for reproduction without later screening or stripping operations.

Vernier Dials—A set of dials graduated to fractions of an inch attached to a precision straightedge on a line-up table to guide the movement of the straight-edge up or down the table when ruling lines on positives. Each dial is especially designed to hold in any position by friction and can be set at any place along the surface of the table.

Vignette—(Art, Photography) 1. An illustration whose margin gradually fade off to blend with the printed sheet. 2. Any small decorative illustration or design used as an ornament in printing.

Visual—(Copy preparation) See *Sketch*.

Waxing—The coating of photocomposition and reproduction proofs on the back with a thin layer of special hot melted wax to make it adhesive for paste makeup instead of pastes or glues. It may be done by coating machines or by hand using a hot plate to melt the wax. For transparencies, the wax is often applied with a pressure sprayer.

"Walk-Away"—(Photomechanical Platemaking) The loss of the printing ability of a press plate due to erosion of the printing design or loss of its ink attraction.

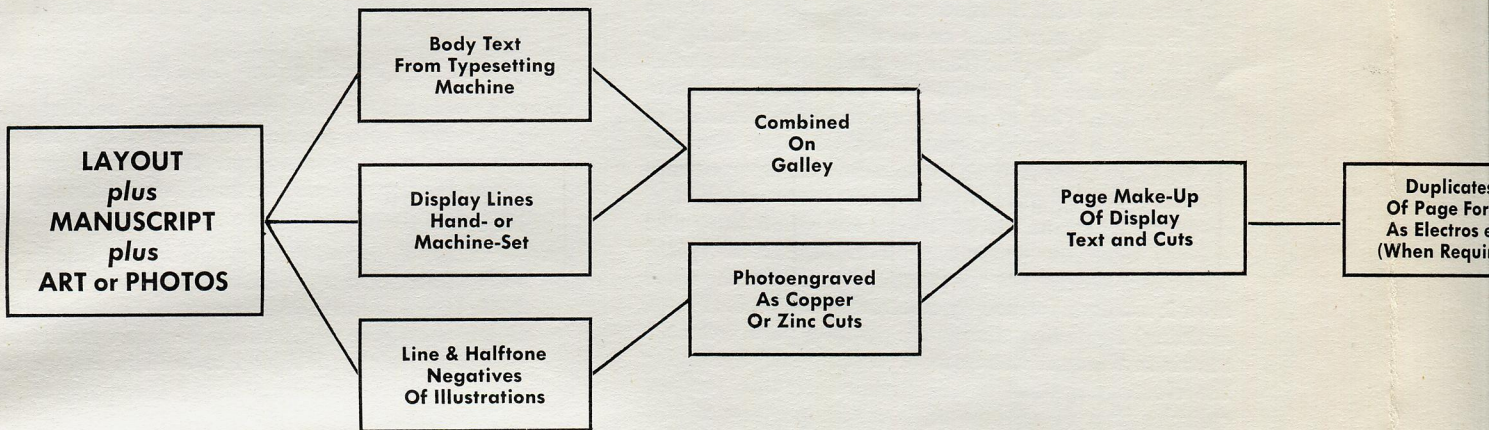
Whirler—(Platemaking and Stripping) A unit of equipment for applying a light-sensitive photomechanical coating to pressplates or a blueline coating to plastic or glass sheets, while they are in rotation. Also called "Plate Coating Machine."

Whiteprint—See *Diazo Print*.

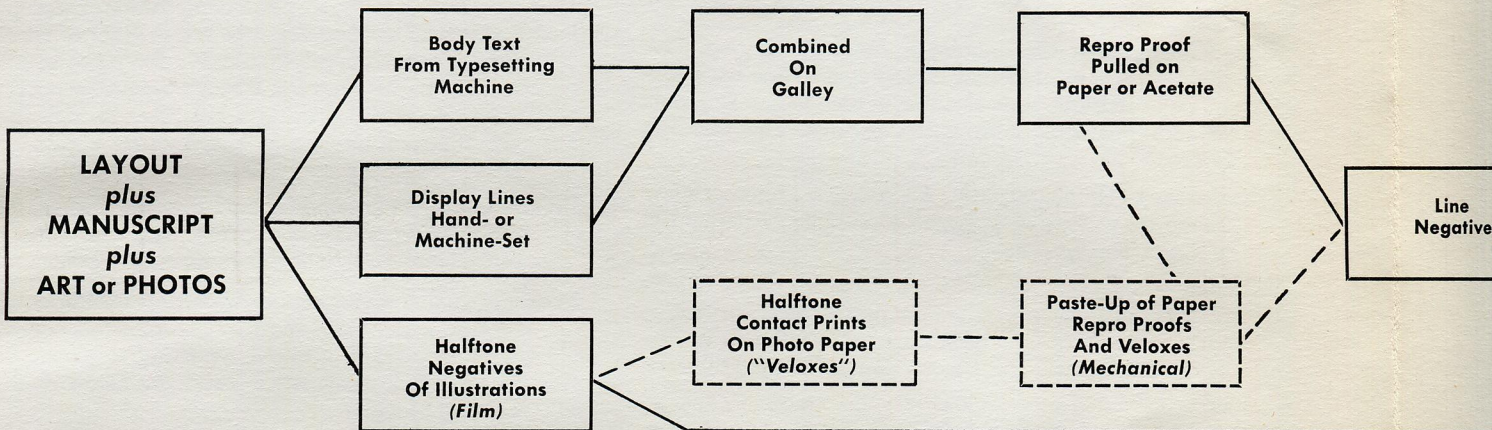
Zipatone—(Copy preparation) (Trade name) A printed adhesive film available in various textures used for applying the textures to areas of illustrative copy.

FLOW CHART OF PRINTING PROCESSES-1

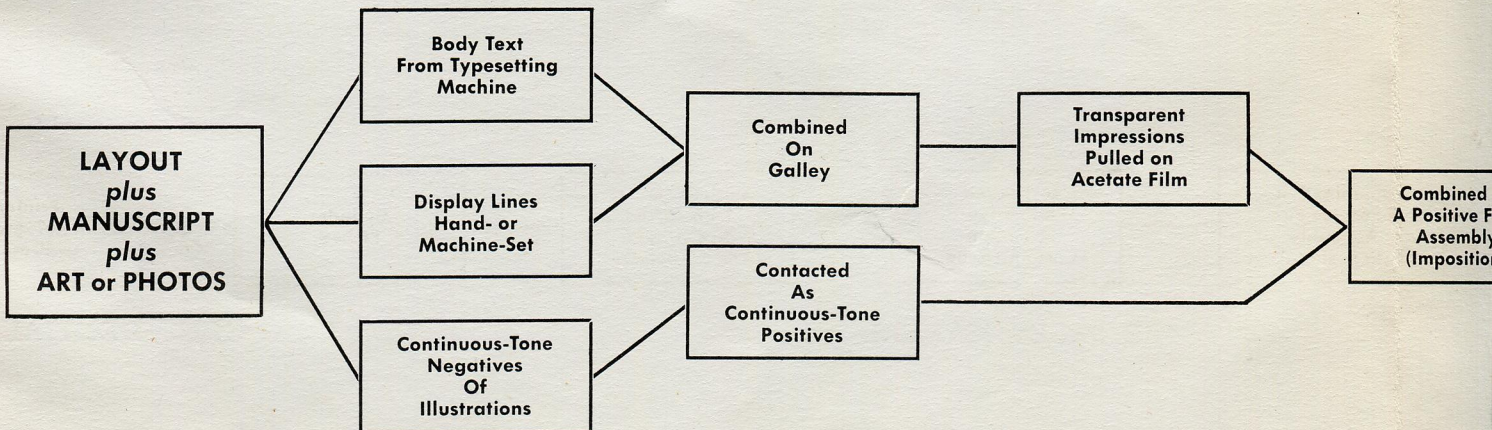
LETTERPRESS-Using Hot Metal Composition



OFFSET LITHOGRAPHY-Using Hot Metal Composition

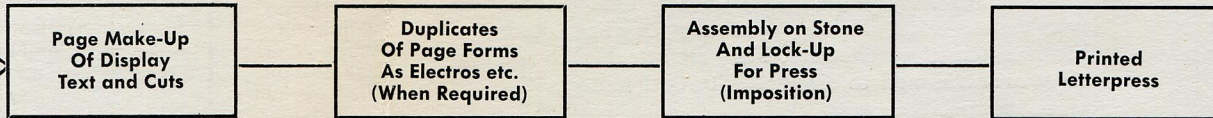


PHOTOGRAVURE-Using Hot Metal Composition

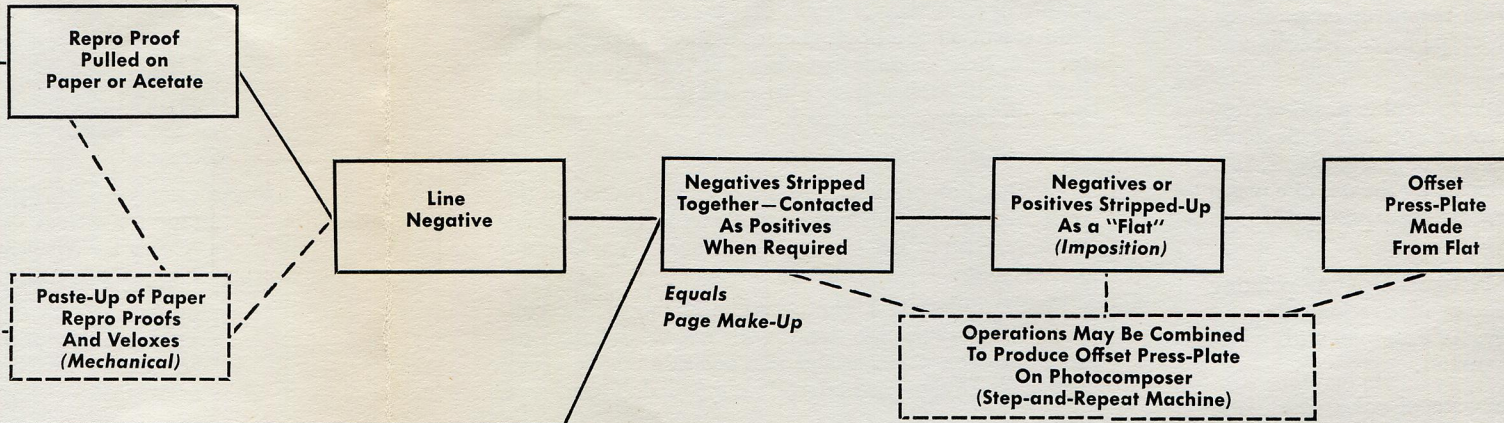


PRINTING PROCESSES—1

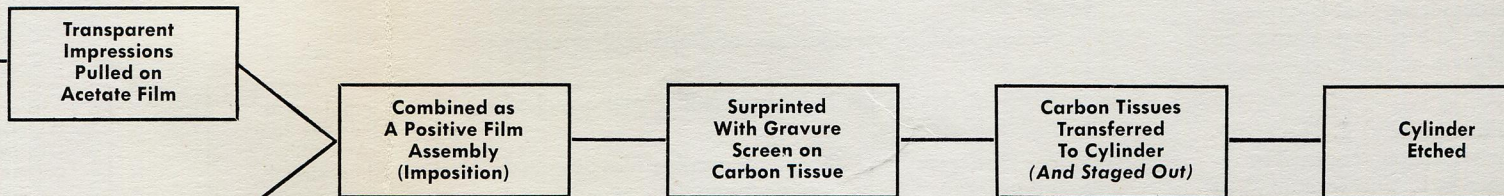
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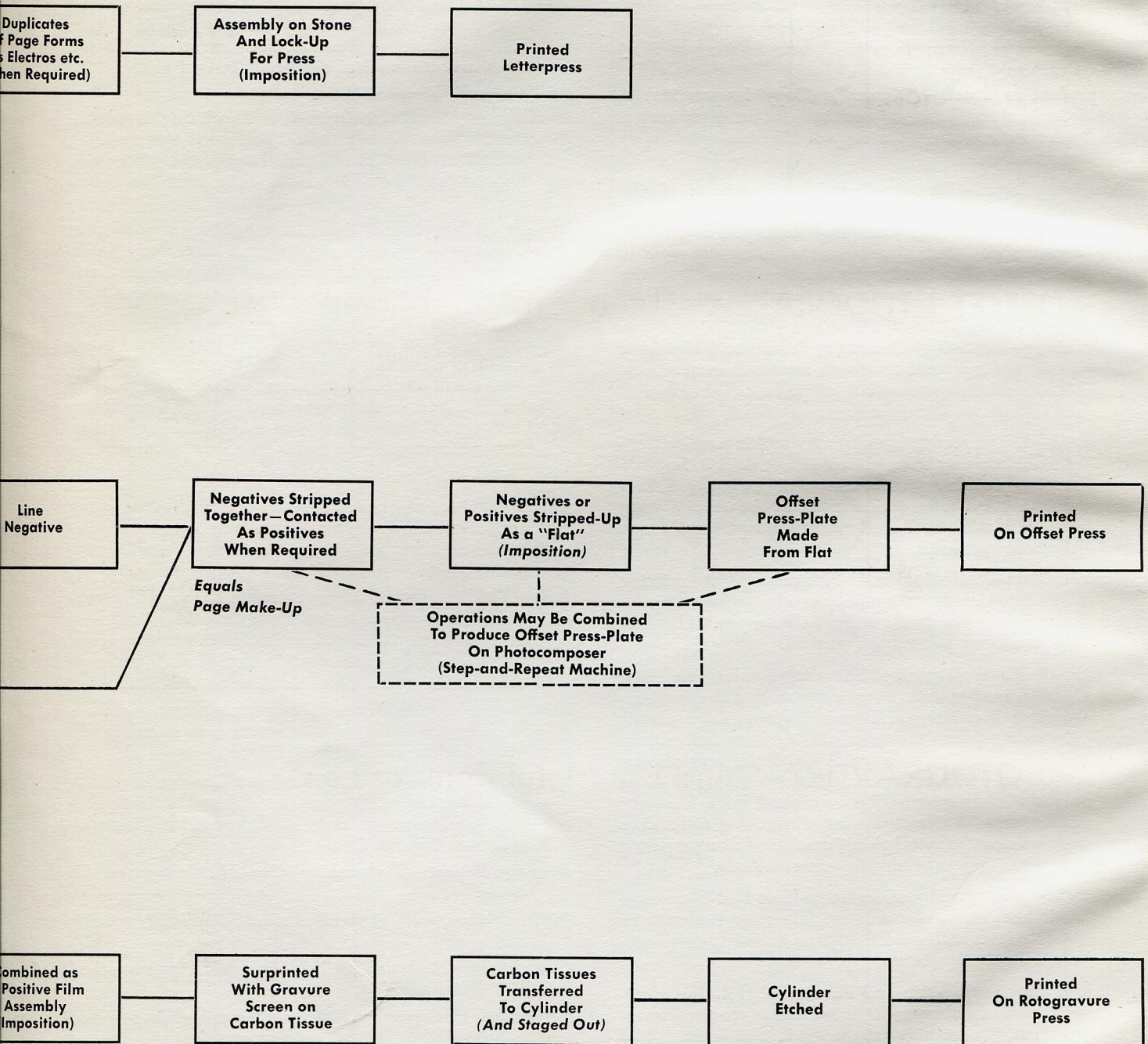
Composition



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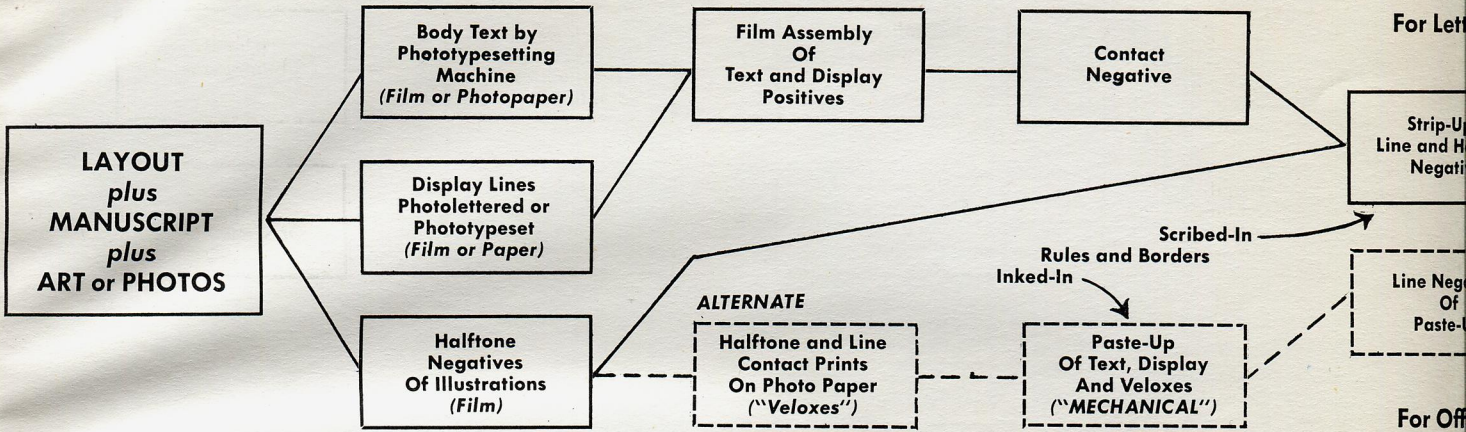


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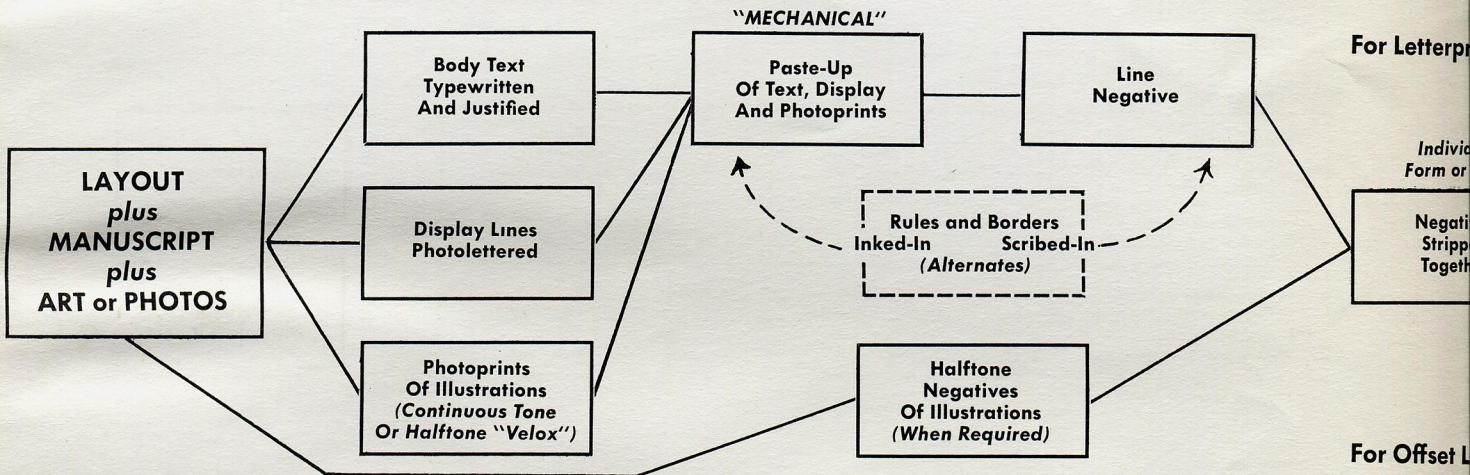


FLOW CHART OF PRINTING PROCESSES-2

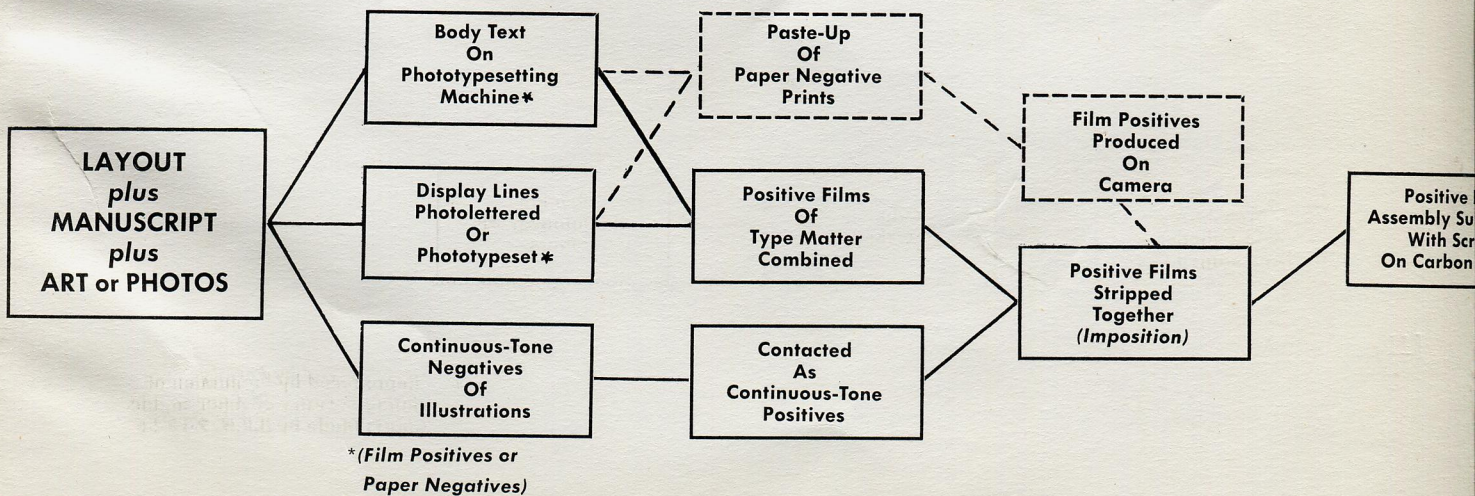
COLD TYPE-Using Photocomposition



COLD TYPE COMPOSITION-Using Typewritten Text

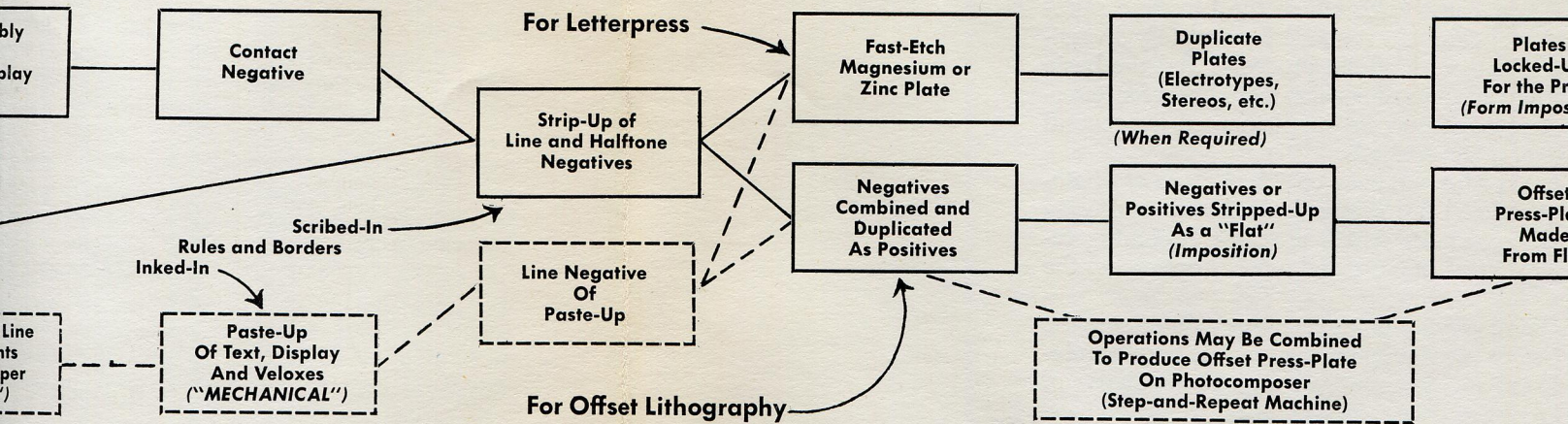


PHOTOGRAVURE-Using Cold Type Composition

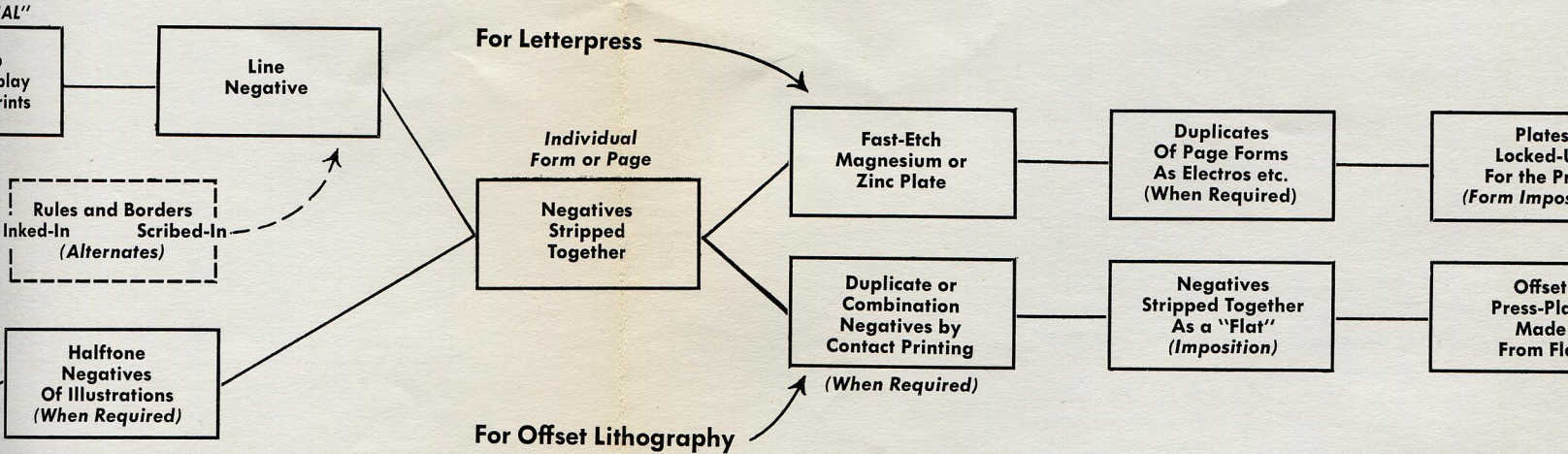


PRINTING PROCESSES-2

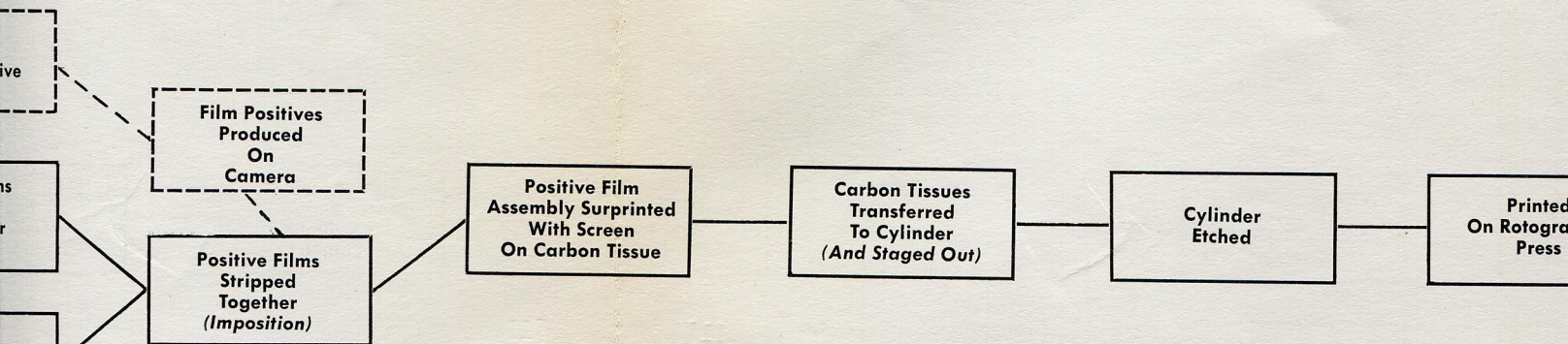
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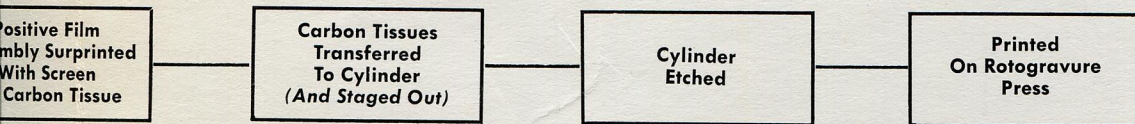
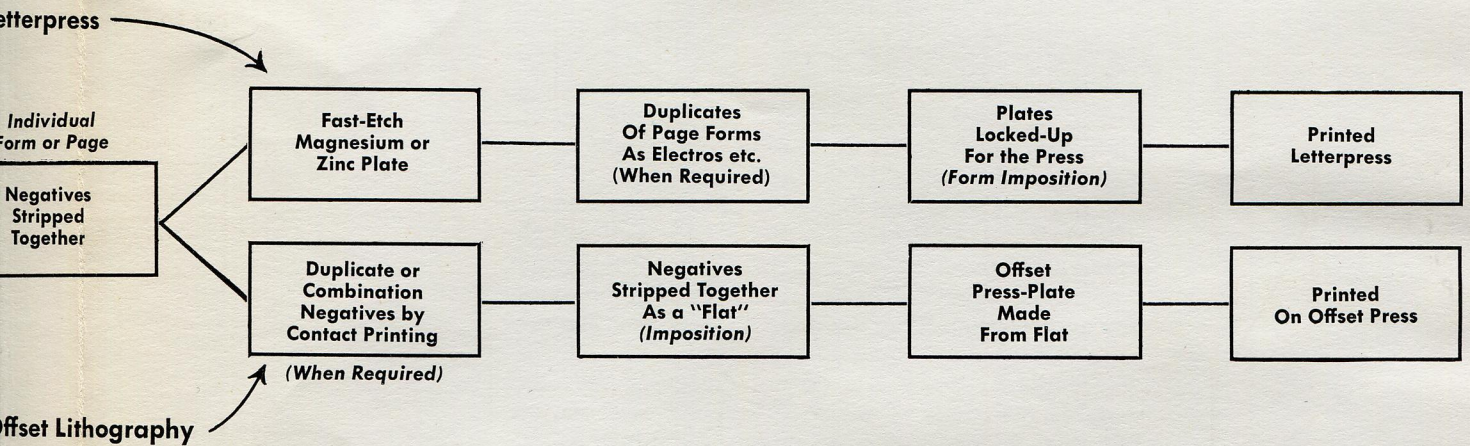
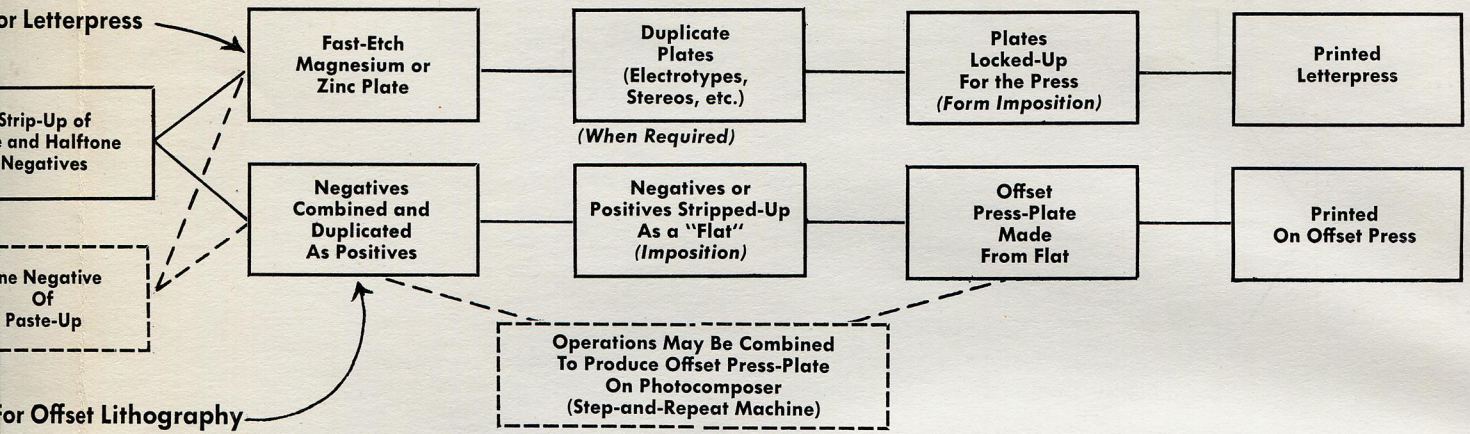
Written Text



Position



(Including Principal Alternates)

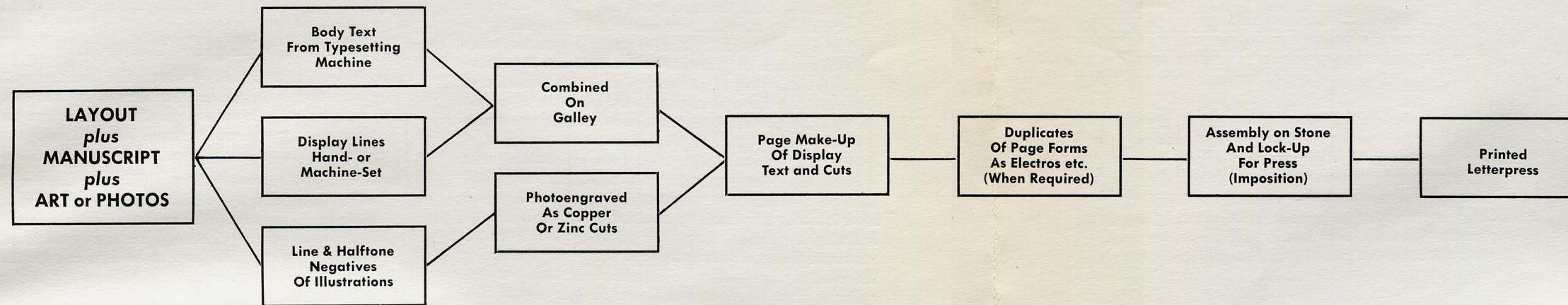


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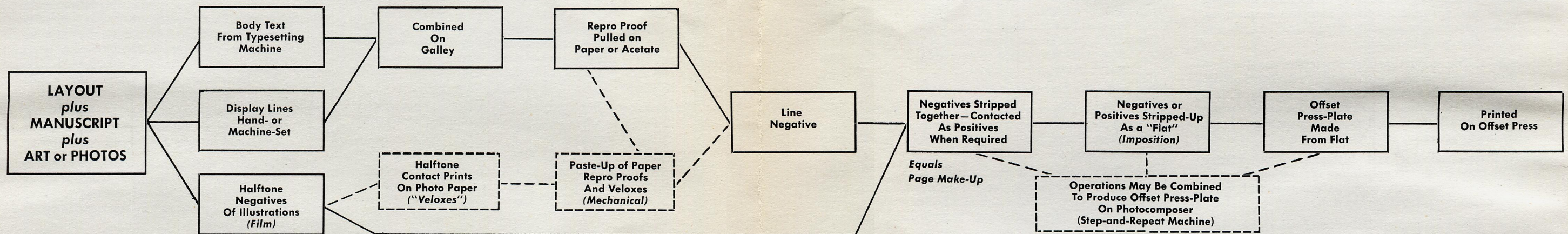
FLOW CHART OF PRINTING PROCESSES-1

(Including Principal Alternates)

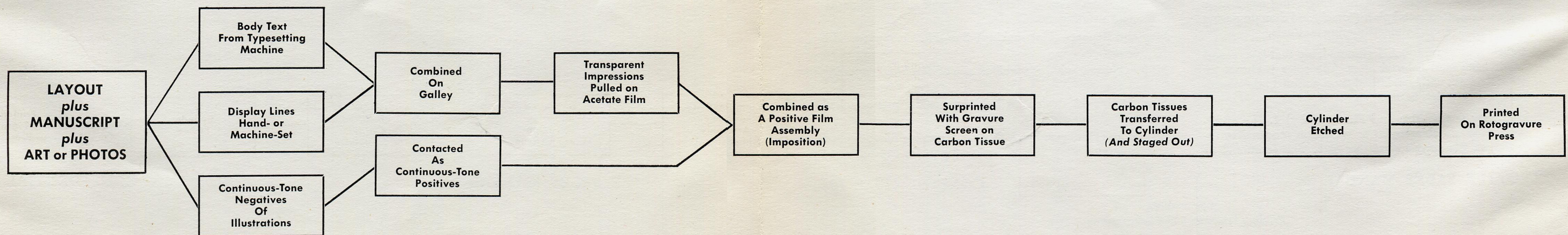
LETTERPRESS-Using Hot Metal Composition



OFFSET LITHOGRAPHY-Using Hot Metal Composition



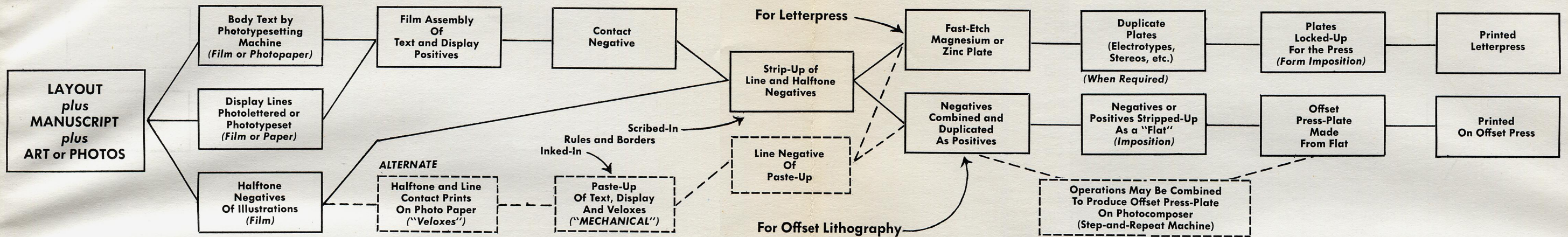
PHOTOGRAVURE-Using Hot Metal Composition



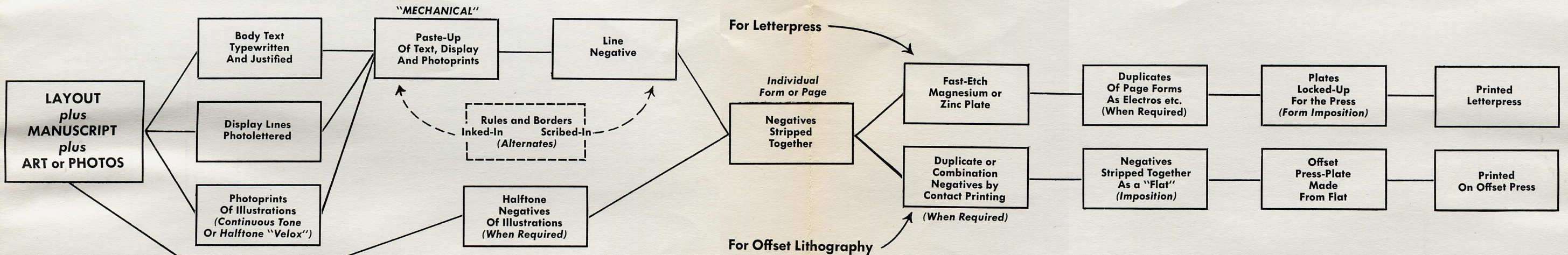
FLOW CHART OF PRINTING PROCESSES-2

(Including Principal Alternates)

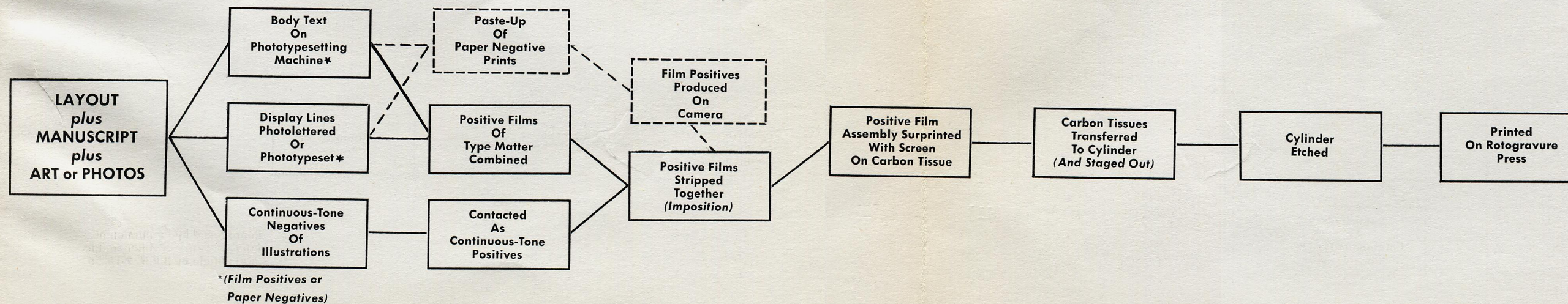
COLD TYPE-Using Photocomposition



COLD TYPE COMPOSITION-Using Typewritten Text



PHOTOGRAVURE-Using Cold Type Composition



Flow Charts of Printing Processes

THIS SUMMARY of the major printing processes has emphasized those differences in procedures for the production of typematter with which the Linotype salesman must be familiar. His customers are rapidly diversifying their plants with added processes and the basic understanding of composing room techniques for letterpress printing must now be supplemented by general knowledge of other methods.

OUR SALES MANUAL units on *The Nature of Phototypesetting* and on *Cold Type* summarize more recently introduced procedures which are now becoming familiar plant routine in more and more shops across the country.

How these varying process methods determine the successive steps of printing production has been graphically analyzed in the accompanying Flow Charts of Printing Processes. These are reproduced here by permission of *Printing Industry of America, Inc.*, from their COLD TYPE HANDBOOK.

Since hot-metal and cold-type composition require differing procedures in their earlier phases of production (regardless of which process is to print them), these Flow Charts embody these distinctions. They follow the progress of composed typematter through each of the three major printing processes: Letterpress, Offset and Gravure. They emphasize variations in makeup and in the further requirements of platemaking, etc. They also show (with dotted-line boxes) alternative methods which may lead to the same result.

But the charts omit the earlier phases of production wherein *every* kind of composition must undergo the essentials of proofreading and correction. At that stage, typematter may require numerous handlings for correction and revision. Even the procedures of proofing now use a variety of machines and processes.

Similarly, the charts do not designate the other variable essentials of makeready, color register, etc. But they do present, more understandably than any previously published diagrams, what happens to typematter when it goes into print.

