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PRINTING AND TYPOGRAPHY FOR BEGINNERS

ANALYSIS OF THE TRADE OF PRINTING

UNIT I	UNIT II	UNIT III	UNIT IV	UNIT V	UNIT VI
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(*Frontispiece.*)

PRINTING AND TYPOGRAPHY FOR BEGINNERS

USING THE SELF-STUDY METHOD

A Textbook for Use in the Part-Time, Continuation, Evening, Prevocational and Vocational Schools

BY

ARNOLD LEVITAS

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PREFACE

The Self-Study Method of Teaching Type-Setting and Printing and Its Correlated Academic Subjects

In all printing classes a certain amount of individual instruction on the part of the teacher is necessary, because it is not usual to find a group of boys in similar stages of development, nor is it possible to advance them all alike and with the same methods. In some printing classes, the need of individual instruction is not so great as in others; but in all of them the need exists.

Now, it would not be possible for the instructor of printing to teach successfully a group of fifteen or more boys unless some method were evolved by which it was made practicable for the student to teach himself at least part of the time—the amount of self-study to depend upon the circumstances in each case. Such a method has been found with the uses of job-cards, or lesson-sheets, and has been successfully applied in the vocational classes of the Continuation Schools, where the need for individual instruction on the part of the teacher and for self-study on the part of the student is greater than in any other type of school.

Whether the need is great or small, the job-cards, or lesson-sheets, will always be found necessary. They will even be found very useful in the class where the teacher is fully able to give all the needed time for individual instruction; for the job-cards not only make the student self-reliant, but also are an added training to the personal instruction by the teacher.

Roughly speaking, there are at present four types of printing classes—those of the Continuation School, the Evening School, the Prevocational School, and the Vocational School. In every one of these types of printing classes the job-cards may be used to good advantage; but the Continuation School

and Evening School printing classes will find them to be productive of the best results, because in these classes new students are coming in at all times, and class instruction under these circumstances would be quite impossible.

In Prevocational and Vocational printing classes, the job-card may also be used to advantage, because it serves as a guide to the student while the instructor is otherwise engaged.

While it is not possible to prepare any plan which will take the place of the instructor, it is of the greatest consequence to find a method which will help the instructor in the teaching and training of his pupils and which will allow him more time for general supervision. This method of self-study is being gradually developed so that it may be used in the printing classes for both vocational and academic instruction.

The material for the job-cards may be of the same kind as is generally used by the teacher in his verbal instruction. The language, of course, must be simpler than is usual in text-books —so that students will have no difficulty in understanding—and the graduated lessons should be so arranged as to keep in step with the intelligence of the average boy and with his ability to advance.

Courses of study and methods of teaching will always depend upon conditions; but a certain general plan may be suggested for the printing class adopting this method of self-study. It would be well if all the printing classes would formulate some general plan which all would follow as far as possible—so that greater harmony might exist in the teaching of printing and typography. Since this book is primarily designed as a text for use by print-shop pupils, information and suggestions helpful to the teacher are given in the form of a Teachers' Manual of Instruction, which is published in a separate pamphlet. There the teachers will find Courses of Study, Methods of Teaching, Equipment for Shops, Methods of Administration, etc., particularly adapted to the plan of instruction followed in the lessons in this text. The methods proposed, together with the material on the job-cards and lesson-sheets presented in this work, have been thoroughly

tested in the printing classes of several schools in New York City for the past six years, and they have been found practical for the purpose desired and productive of good results.

It is the hope and expectation of the author that the material within will prove of use to the printing teachers of the various schools, and it is presented herewith in the spirit of cooperation and helpfulness.

For cuts, illustrations, and suggestions, the author is indebted to the following: F. K. Phillips, Director Educational Department, American Type Founders Company, 300 Communipaw Avenue, Jersey City, N. J. Albert Highton, Literary Editor, American Writing Paper Co., Holyoke, Mass. J. W. Kirkpatrick, Sales Manager, Chandler & Price Co., Cleveland, Ohio. T. J. Gutman, Publicity Department, R. Hoe & Company, Grand Street, New York City. W. G. Lownds, Publicity Department, Mergenthaler Linotype Co., 461 Eighth Ave., New York City. Theodore Forster, Vice President, Kent Machine Works, 37 Gold Street, Brooklyn, N. Y. Edward A. Raisbeck, Manager, Raisbeck Electrotype Company, 409 Pearl Street, New York City. T. F. Rutledge, Director of Publicity, Lanston Monotype Company, Philadelphia, Pa.

ARNOLD LEVITAS.

NEW YORK,
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PRINTING AND TYPOGRAPHY FOR BEGINNERS

UNIT I

THE PRACTICAL COURSE IN COMPOSITION

Preliminary Training.—The first thing for the student in typography to know is the type-case. For this purpose we have the job-card on "The Type-Case"—which explains the cases and shows how to acquire a knowledge of them—that is, a knowledge of the location of each letter and character of the lower case and upper case. At this point the student is to set up a line of type of each letter and character in the case. Through this he learns three things—namely, how to hold the stick and set type, the location of the letters, and how these letters appear upside down.

PRELIMINARY JOB—THE TYPE-CASE

There are two type-cases on every frame—the upper case and the lower case (Figs. 1 and 2). In the upper case are kept the capitals and small capitals, and in the lower case are kept the minuscules (or small letters).

Each letter is kept in a different compartment, and the arrangement of the letters is in accordance with their most convenient use. The diagram on each case shows the location of each letter and character.

On the ledge of the upper case there is a composing-stick (Fig. 3), which is used for setting type. The stick should be held in the left hand, and the letters are to be picked up with the right hand and placed in the stick. The thumb of the

left hand should be held next to the last letter in the stick to keep the type from falling out.

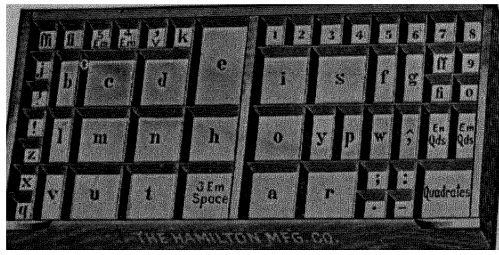


FIG. 1.—The Lower Case

Type must be set with the nicks up, the face of the letter on the outside, and each letter should be placed close to the preceding one.

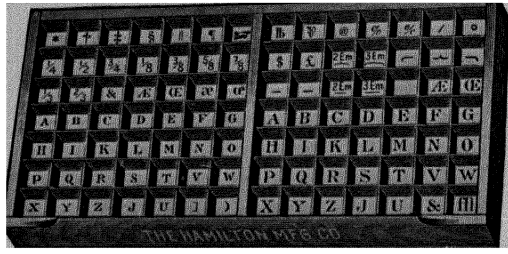


FIG. 2.—The Upper Case

An important feature of a type is the nick on the side of the body. In many cases there may be two, three, or even four nicks. Usually, all the types of a font have nicks which are

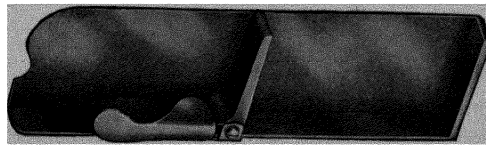


FIG. 3.—Composing-Stick

identical in number and position; and, when the types are composed in lines, these nicks match each other and form continuous grooves on the lower part of the line of type.

In order to learn the location of the letters in the case, the best method is to set up a line of each letter—beginning with the letter "a" and continuing until all the letters are set.

After each line of letters is set up, it is to be carefully studied, so that the student will be able to recognize the letters upside down. The line is then to be put back in the proper place of the case—a few letters at a time.

After all the letters are set up, the logotypes should be set, then the punctuation-marks, and finally the figures.

After the lower case has been set and learned, the student takes up the upper case—setting first the capitals, then the small capitals, and, lastly, all the characters at the top of the case.

Questions

1. What advantage is there in locating the letters in the type-case in this peculiar way?
2. What is the reason for the nicks on the type-characters?
3. Why are types made to read upside down?

After learning the cases, the next lesson, or job, gives an explanation of the system of spacing. With the help of this card, the student learns to recognize the various spaces and their location.

PRELIMINARY JOB—SPACING

Spaces between Words.—All type and material in the printing shop is made to conform to a certain measure based on a system of points. The point-system is arranged to conform to the inch, and the various dimensions used in printing are definite parts of the inch.

The inch contains 72 points—which means, of course, that the point is one-seventy-second of an inch.

The various sizes of type and spaces are designated by points, as, for instance, 8-point type, 10-point type, etc.

It is necessary to put space between the words of all type-composition, so that it is possible to read the text. For that purpose, a system of spacing has been arranged based on t' size of the type.

The em-quad is the square of the type. If type is 10-point, the em-quad will be 10 points in width and depth; if type is 8-point, it will be 8 points in width and depth; and so on.

The en-quad is half the thickness of the em-quad. In depth, it is, of course, the size of type for which it is used.

The three-to-em space is one-third the thickness of the em-quad, and is the space used originally between words in the text.

The four-to-em space is one-fourth the thickness of the em-quad, and it is used when it is necessary to decrease the original spacing between words.

The five-to-em space is one-fifth the thickness of the em-quad, and is the smallest space used.

There are also 2-em quads (twice the thickness of the em-quad) and 3-em quads (three times the thickness of the em-quad), which are used for spacing out the last line of a paragraph.

Every kind of space and quad has its place in the lower case, and the diagram will show where each belongs.

A line of each of the spaces and quads should be set up for purposes of study.

DIAGRAM OF SPACES



Spacing between Lines.—There are also certain spaces used for the purpose of separating lines. These are known as leads, slugs, reglets, metal furniture, wooden furniture, etc.

Leads—which are usually 2 points in thickness—are used for the purpose of separating the lines of type so as to make the reading more legible.

Slugs—which are usually 6 points in thickness—are used for opening the space between type-lines more; they are of particular use for display composition.

Reglets—made of wood—come in two thicknesses—6-point and 12-point. They are used for display-lines and for

composition in which it is desirable to have plenty of space between the lines of type.

Leads, slugs, and reglets come in different lengths—so as to fit the different measures of type-composition. These lengths conform to a measure called "pica." This pica is also based on the inch, and is one-sixth of an inch.

It is usual to say, for instance, "a 24-em lead," "a 17-em slug," or "a 20-em reglet"—meaning by that the em of pica, or 12-point.

The 12-point em is usually considered as the unit of measurement for material, since it conforms so conveniently with the inch—being one-sixth of an inch.

Computing Space.—The em-quad, being the square of the type, depends for its size on the size of type—so that the 6-point em-quad is somewhat smaller than the 8-point em-quad, and the 8-point em-quad is somewhat smaller than the 10-point em-quad, etc.

In computing space, it is necessary to find the number of ems of a certain given size of type which it is possible to accommodate in a certain given space. It is only after the number of ems has been found that it is possible to find the number of words, since the number of words for a given space will depend upon the number of ems.

The printer, in charging for type-composition, may use the em-measurement. In other words, he may charge the customer so much per 1,000 ems of composition of a certain size.

Through the above lesson, the student will familiarize himself with leads, slugs, and reglets and their uses.

Questions

1. What is the unit of spacing?
2. How many five-to-em spaces are contained within the em-quad?
3. What is the need for the different kinds of spaces?

When the student has acquired a knowledge of the case and spacing, he takes up the following lesson, which gives him information in drawing a diagram of the case. This diagram should be drawn before first job is attempted.

PRELIMINARY JOB—DRAWING A DIAGRAM

In drawing the diagram of the lower case (Fig. 4a), it is, first of all, necessary to draw the outline—which may be made to any convenient size, such as 8 by 3½ inches.

The next thing is to divide the rectangle in two parts—drawing a heavy bar in the middle. The width of diagram

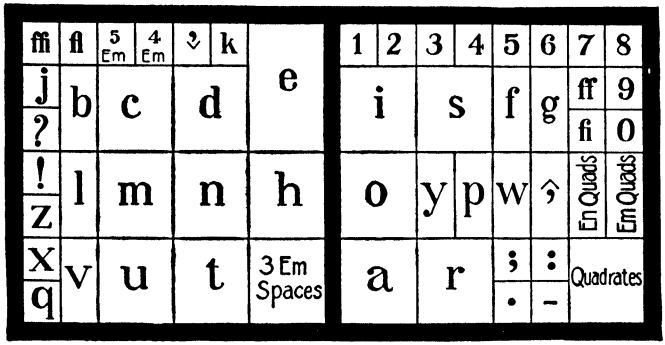


FIG. 4a.—Diagram of Lower Case

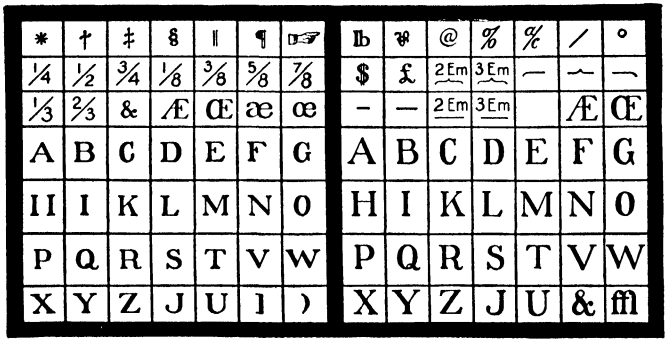


FIG. 4b.—Diagram of Upper Case

is then to be divided into eight parts, 1 inch to each part. The depth of case is divided into three and one-half parts—1 inch for each of the whole boxes and ½ inch each for the half boxes. Some of the boxes are again to be divided in half and a few others in four parts—just as they appear in the case. The letters are then to be written in, in imitation of print.

The upper-case (Fig. 4d) outline may also be made to 8 by $3\frac{1}{2}$ inches, and the width should be divided in half with a heavy bar. Each side of 4 inches in width is to be equally divided into seven parts. The depth is to be divided into three full boxes and four half boxes—allowing seven-tenths of an inch to each full box and seven-twentieths of an inch to each half box.

Letters and characters should then be written in, imitating the characters, in accordance with the lay of the case.

Questions

1. How many compartments are there in the lower case?
2. How many compartments are there in the upper case?
3. Where are the capital "J" and the capital "U" located?

Job. No. 1—as the first job is called—consists of six lines. The first line is of single letters; the second, third, fourth, and fifth lines are of simple words, spaced; and the sixth line is of more difficult words. The student finds full directions and explanation of how to proceed with his job on the card; and, if he possesses ordinary intelligence, he should have no difficulty in setting it.

JOB NO. 1—WORDS

The composing-stick is held in the left hand (Figs. 5 and 6), and the type is set therein. Keep your thumb next to the type you are setting. Set your type with the nicks up.

Set the clamp to measure 18 picas, and follow the copy closely.

Set one full line of "e." No space between letters.

Set one full line of "he." Use 3-em (3-to-em[1]) space after each "he."

Set one full line of "the." Use 3-em space after each "the."

Copy the other lines, as shown. Use 3-em space after each word at first; then space out to make full lines.

When the 3-em space is not sufficient to make the line tight, a larger space—such as the en-quad—should be sub-

[1] The terms "3-to-em," "4-to-em," etc., are usually called "3-em," "4-em," etc., for short.

stituted for the 3-em space in as many places as are necessary to make the line complete and properly tight.

When the use of the 3-em space between the words will not allow all the letters to go into the line, a smaller space—such as the 4-em space—should

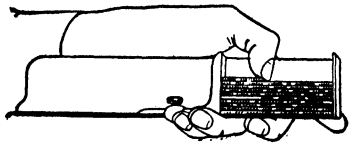


FIG. 5.—Holding the Composing-Stick

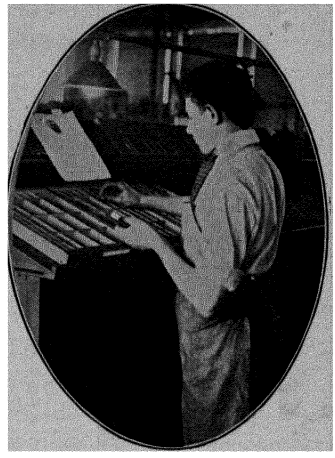


FIG. 6.—Setting Type

be substituted for the 3-em space in as many places as necessary to make the line complete.

Put a lead after each line.

eeee

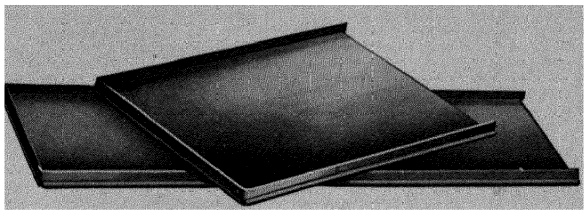


FIG. 7.—Galleys

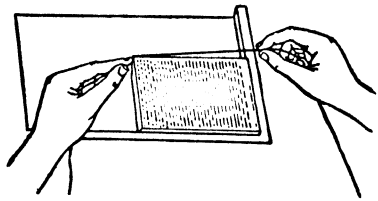


FIG. 8.—Tying Up Job

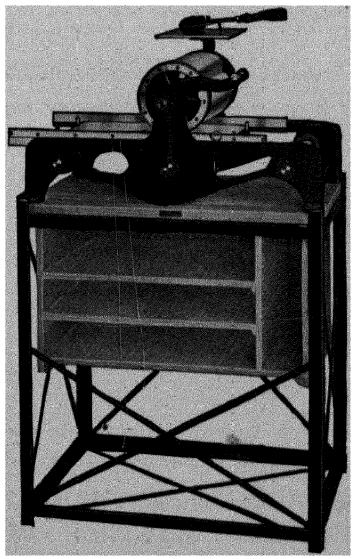


FIG. 9.—Proof-Press

(*a*) **The Proof-Press.**—As just stated, when a job is set, it must be tied up. Then it is placed on the proof-press (Fig. 9). The job is inked up with the little roller (Fig. 10), and a sheet of paper is put over it. The paper should be sufficiently large to allow margins for marking errors.

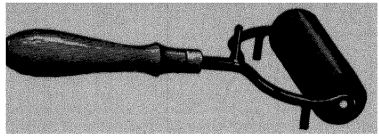


FIG. 10.—Hand-Roller

Over this sheet of paper it is usually necessary to place an additional sheet or more of paper in order to get the proper impression. The handle on the side of the proof-press is then turned—giving the impression (Fig. 11).

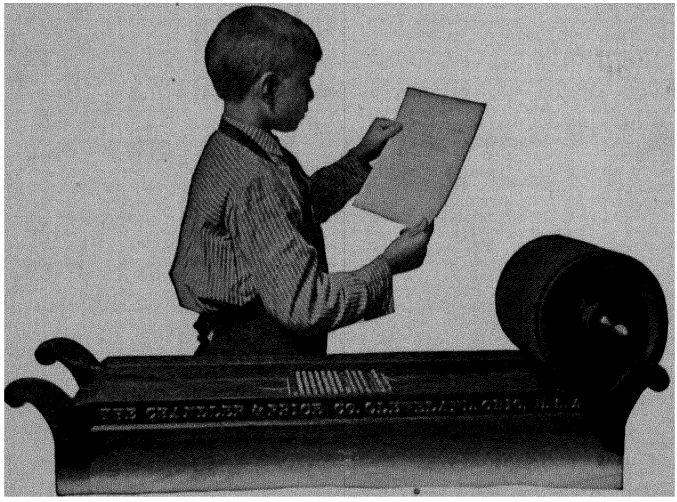


FIG. 11.—Pulling Proofs

When the proofs are pulled, the job must be washed with benzine and removed from proof-press.

In placing the job on proof-press, the galley is placed on top of the zinc-plate of press and the job is slid off; when the

job is to be removed from the proof-press, the galley on which the job is to be placed must be on line with the zinc-plate; there is space on either end for the edge of that galley.

When a job is to be removed from the proof-press, one student is to hold the galley, while another student is to push the job onto it. A student should never take a job off the press by himself.

Questions

1. How is the proof pulled?
2. Why must margins be allowed on the proof?
3. After proof is taken, how is the ink removed from the job?

When the corrections are all properly marked, the student takes the next card—on "Correcting"—which explains how to make the corrections in the type.

(*b*) **Correcting.**—*Position of Galley for Correcting.*—The corrections are made at the case. The galley is placed at one side of the case, if possible, with the head of the galley and the top of the lines to the right.



FIG. 12.—Tweezers for Correcting

Correcting Simple Errors.—Correcting simple errors, such as changing one type for another of the same width, turning an inverted letter, or the transposition of letters or words, is done by pressing the line at both ends to lift it up about one-third of its height, and picking out the wrong types with the finger and thumb. The line is then dropped in place and the right types put in. Tweezers are sometimes used for removing wrong types. This makes it unnecessary to lift the line. (See Fig. 12.)

Correcting More Serious Errors.—Where a word or words are left out, where a word is to be removed, or where there is some overrunning to be done, the line should be lifted out, put in the composing-stick, and respaced.

Questions

1. How is the galley to be placed for correcting?
2. How are simple errors to be corrected?
3. How are lines with several errors in them to be corrected?

When the job is corrected, proved up again, and found clear of errors, the student may then distribute it. There is another card explaining how this is done.

(c) **Distributing.**—*Holding the Type Correctly.*—The type should be placed with the nicks up, and the student should read each word upside down before distributing it.

Picking Off Words or Syllables.—Start putting the letters and characters in their proper boxes. Begin at the right-

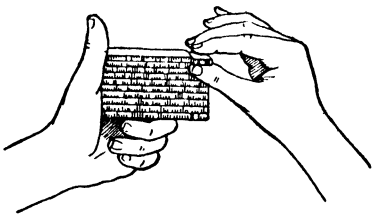


FIG. 13a.—Distributing Type

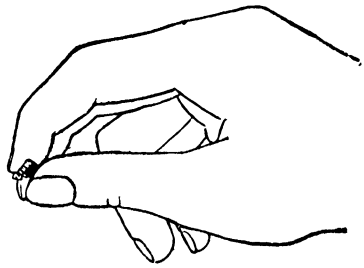


FIG. 13b.—Distributing Words

hand side of the line, and with the second finger move the last word of the line slightly toward you, at the same time moving the thumb underneath the particular word. Where the word is too long, only parts of it should be taken. (See Figs. 13a and b.)

Spelling Off the Words.—Drop the types into their boxes by spelling off the word (silently) as you drop the letters. Each word should be carefully spelled as you take it from the line, in order to insure the dropping of each type into its own box. Each space should be carefully put where it belongs.

Questions

1. How should type for distribution be held?
2. How should words be distributed?
3. Which hand is used for distributing the type? Why?

A similar procedure is followed with Job No. 2, and, in proper order, follow Job No. 3, etc., up to Job No. 20—each one a little harder than the preceding. With each succeeding job the student gets a little more facility—until he masters the various processes without difficulty.

JOB NO. 2—LINES

The composing-stick is held in the left hand, and the type is set therein. Keep your thumb next to the type you are setting. Set up your type with the nicks up.

Set the clamp to measure 18 picas, and follow the copy closely.

Start first line with capital letter. Use 3-em space after each word, and increase spacing if necessary.

Start second line with capital letter. Use 3-em space after each word, and increase spacing later to fill line.

Put a lead after each line.

Start third line with capital letter. Use a 3-em space after each word, and increase spacing later to fill line.

Start fourth line with a capital letter. Space the line to suit.

When justifying line, be careful to make the spacing between words as even as possible. Use a slightly larger space when the line is not sufficiently tight, and use a slightly smaller space when all the letters of the line will not come within the line. Change the spacing only in as many places as will be required to make the line complete.

Put a lead after each line.

Read the copy carefully and set the type.
We must learn to tell one space from another.
Locate letters with your eyes before setting.
Results will come through constant training.

Questions

1. Why should the spacing between words be made fairly even?
2. What is the first space to be used in setting a line?
3. When is it necessary to increase the spacing of a line after the 3-to-em space is first used?

JOB NO. 3—PARAGRAPH

The composing-stick is held in the left hand, and the type is set therein. Keep your thumb next to the type you are setting. Set your type with the nicks up.

Set the clamp to measure 18 picas, and follow the copy closely.

First, place an em-quad in the stick; then the capital letter. Place a 3-em space after each word. When the line is loose, change the 3-em spaces to en-quads, one at a time, until the last letter is at the very end of the line. When it is necessary to decrease the spacing in order to get another letter or two in the line, change 3-em spaces to 4-em spaces. Each line should be respaced in like manner when necessary—either increasing or decreasing the original 3-em spaces. When the whole word does not fit on the line, it may be broken on one of its syllables. Never place a space at the end of a line.

The second and following lines are started without space of any kind.

At end of paragraph use large quads, both sizes, to fill in blank space. If a small space is needed to make the line tight, choose one or two that fit and place them next to the period.

Put a lead after each line.

> The only way to do a thing well is to do it over and over again; because habits are not made in a minute, and all thoughts and actions, all arts and crafts, are founded upon habit; while facility is acquired only with constant repetitions.

Questions

1. When the whole word does not fit at the end of the line, how is it broken?
2. How is the first line of a paragraph indented?
3. How is the last line of the paragraph to be spaced?

JOB NO. 4—TWO PARAGRAPHS

Set the clamp to measure 18 picas, and follow the copy closely.

First, place an em-quad in the stick; then the capital letter. Place a 3-em space after each word. When the line is too short or too long, change the 3-em spaces to larger or smaller spaces, one at a time, until the line is even. Each line is respaced in the same manner. Use a 1-em quad at the end of sentence within a paragraph. When the whole word does not fit on the line, the word may be broken on a syllable. Never place a space at the end of a line.

At the end of a paragraph use large quads, both sizes, to fill in blank space. If small space is needed to make line tight, choose one or two that fit and place them next to the period.

Put a lead after each line.

> The educational value of printing has secured its introduction into the schools of the country. This value is based upon the general principles which are the foundation of all other subjects in the school curriculum.
>
> Printing, whether used as an aid in cultural training or as a subject in manual training, has such unbounded qualifications that one hesitates to attempt a detailed description of its educational possibilities. To attempt such a description means to delve into an area that is beyond human conception.

Questions

1. How may the lines of a paragraph be made even?
2. How much space is to be used between sentences within a paragraph?
3. Where are the small spaces at the end of a paragraph to be placed?

JOB NO. 5—HEADING

Set the clamp to measure 20 picas, and follow the copy closely.

Since the measure on this job is to be longer than the copy, more words will go into the line than in the original, and the beginning and ending of the lines will be somewhat different.

Set the heading in 10-point capitals, and space it in the center. Beginning the paragraph, place an em-quad in the stick; then the capital letter. Place a 3-em space after each word. When the line is finished, it may be necessary to change the 3-em spaces to larger or smaller spaces, according to conditions, in order to make the line even.

Never place a space at the end of a line within the paragraph.

The second and following lines are started without space of any kind.

At the end of a paragraph use large quads, both sizes, to fill in blank space. If a small space is needed to make line tight, choose one or two that fit and place them next to period.

In the matter of justifying the lines, it may become necessary to break a word. This should occur only on the end of a syllable, and a hyphen should always be placed after that syllable at the end of the line.

On this job it may become necessary, in some cases, to use a larger space between words than the en-quad. This would occur where the en-quad is not sufficient to make the line tight and it is not possible to break the last word—it being either a long monosyllable or a word with long syllables. In this case, a combination of 3-em and 4-em spaces should be substituted for the en-quad until the line is tight.

When, after using 4-em spaces between the words in a line, it is still not possible to get all the letters in, it is best to take out the last word or syllable—as the case may be—and respace the line with larger spaces—even if it is necessary to use in some cases, or all cases, a combination of two 3-em spaces. This is done to avoid using the 5-em space in the other alternative, since the 5-em space is too small a space

to use between words. The 5-em space should only be used in combination with another space, when necessary.

Place a lead between the lines of matter.

THE BRAIN

Every time you think a new thought, a tiny ray-dot pushes up into the cortex of your cerebrum, or upper brain, trailing behind it an insulated nerve-wire, connecting it with your nervous centers of thought and action.

Every time you rethink that thought, you make it stronger and imperceptibly larger, increasing also the conductivity along the nerve-wire which connects it up with your ego.

Questions

1. How is the heading of a job spaced?
2. Where the en-quad used between the words in the line is not sufficient, what space should be used?
3. Is it right to use 5-to-em spaces between the words?

JOB NO. 6—SMALLER TYPE

Set the clamp to measure 18 picas, and follow the copy closely. Set this in 8-point.

Set the heading in 8-point capitals, in the center of the line—spacing evenly on both sides. Put en-quads between the words in the heading. Beginning the paragraph, place an em-quad in the stick; then the capital letter. Place a 3-em space after each word. When the line is finished, it may be necessary to change the 3-em spaces to larger or smaller spaces, according to conditions, in order to make the line even. Never place a space at the end of a line within the paragraph.

Since the type to be used on this job is smaller than that of the copy, you will be able to get more words in each line.

Put leads between the lines.

TO DO A THING WELL

The only way to learn to do a thing is to do it, and then keep on doing it. For we need no allegory to describe the brain as a bundle of habits.

If you could lift the top of your skull and look down into your own mind, you would see these habits as a physical fact. Every time you think a new thought, a tiny ray-dot pushes up into the cortex of your cerebrum, or upper brain, trailing behind it an insulated nerve-wire, connecting it with your nervous centers of thought and action.

Questions

1. What spacing should be placed between words set in capitals—as in the heading of this job?
2. In setting the job in 8-point type, will it be possible to get more or fewer words within the line?
3. Where the line has been spaced with 3-to-em and 4-to-em spaces, and it is still loose, what is to be done to make the line even and tight?

JOB NO. 7—HANGING INDENTION

This job is known as "hanging indention," because each line, except the first, is indented with a quad, and hangs under the full-length line. All lines are spaced in the same manner as in type-matter with regular indention.

Set the clamp to measure 18 picas, and follow the copy closely.

Do not begin the first line with a quad.

On the second, third, and following lines a 2-em quad is placed to make the blank space, as shown. Each line is spaced and respaced, as in all other jobs you have set.

Put a lead between the lines.

I believe in the United States of America as a government of the people, by the people, for the people; whose just powers are derived from the consent of the governed; a democracy in a republic; a perfect union, one and inseparable; established upon the principles of freedom, equality, justice, and humanity, for which American patriots sacrificed their lives and fortunes.

Questions

1. How should the first line of a hanging indention be set?
2. What spacing should be used at the beginning of the second and following lines in order to make the paragraph a hanging indention?
3. What kind of spacing should be used between the words?

JOB NO. 8—SQUARE INDENTION

This job is known as "square indention," because each line, after the first, is indented the same on each side, making a square form. Bear in mind the method of making different indentions—regular, hanging, and square.

Set clamp to measure 18 picas, and follow the copy closely.

Set first line full measure. Each following line is indented with a 2-em quad on each side, as shown. Each line is spaced and respaced, as in all other jobs.

Put a lead between the lines.

Never force a lead into a stick. If a lead does not fit easily in the stick, take it out and try again. If then it does not fit properly, try another lead, or consult the teacher. Leads are easily bent; and, once bent, cannot be used again. Place one end of the lead in a corner of the stick, against the type; and, if the lead is of proper size, it will fall into place of its own weight. All leads and slugs are cut to even picas, and will fit any measure of the stick.

Questions

1. How should the first line of a square indention be set?
2. How should the second and following lines of a square indention be set?
3. How should the last line in the paragraph be spaced?

JOB NO. 9—POETRY

This is a job of poetry. Set each line as it appears on the copy—indenting alternate lines.

The spacing in this job must be even, using three-to-em spaces between words and allowing lines to end as they will.

Set your measure to 20 picas.

Put a lead between the lines.

Ye that have faith to look with fearless eyes
  Beyond the tragedy of a world at strife,
And know that out of death and night shall rise
  The dawn of ampler life—
Rejoice, whatever anguish rend your heart,
  That God has given to you the priceless dower
To live in these great times and bear your part
  In Freedom's crowning hour;
That ye may tell your sons who see the light
  High in the heavens—their heritage to take—
"I saw the powers of darkness put to flight;
  I saw the morning break."

Questions

1. How should the lines in a job of poetry be set?
2. What indention should be used in the alternate lines of this job?
3. What spacing should be used between the lines?

JOB NO. 10—CHANGE TO REGULAR INDENTION

Set this job with regular indention. First line is indented and the other lines are set flush.

Set your stick to measure 20 picas.

Since the arrangement of this job is to be changed from copy, the lines, of course, will not be the same as in the copy.

Put a lead between the lines.

When spacing a line, see that the line fits fairly tight in the stick and does not move from side to side. It should not be so tight as to prevent removing from the stick, and yet it should not be so loose as to permit the type moving. Never force a space in a line. This will cause bent or broken type. If you have difficulty in getting the space down, use a smaller space or a different combination of spaces in the line.

Questions

1. How should the first line of this job be set?
2. How should the second and following lines be set?
3. By changing from hanging to regular indention, is it possible to save some space? If so, how?

JOB NO. 11—CHANGE TO SQUARE INDENTION

On this job you must set type in square indention. The first line is set to the full width of the stick, without a quad. The second and following lines start and finish with a 2-em quad. You must decide on the proper number of words to fit in a line.

Set your stick to measure 20 picas.

Put a lead between the lines.

Type is put up, or packed, in fonts, or outfits, of one size and style. A font is a complete collection of one size, with the proper apportionment of each character, for use in printing. Job-fonts contain all the capital letters, figures, and punctuation-marks. Plain type in the smaller sizes, 6-, 8-, 10-, and 12-point, is known as body-type. Heavy-faced type and the larger sizes are known as display, or job, type.

Questions

1. How should the first line of this job be set?
2. How are the second and following lines to be set?
3. In changing from regular to square indention, will space be increased or saved, and how?

JOB NO. 12—CHANGE TO HANGING INDENTION

On this job you must set the type in hanging indention. The first line is set to the full width of the stick—20 picas—without a quad. The second and following lines start with a 2-em quad. You must decide on the proper number of words to fit in a line.

Put a lead between the lines.

> The brass frames on which we store type that is to be used in the future, or type that has been used and is not yet distributed, are called "galleys." Galleys are made of brass, sheet tin, and, sometimes, of wood. The wooden strips, which are 6 and 12 points in thickness and from 10 to 51 picas in length, are known as reglets. These reglets are used where 6-point or larger space is desired between the lines. Being much lighter and cheaper than leads and slugs, they are used mostly for wide spaces. If 12 or 18 points are desired between certain lines of a job, then we use the reglets almost exclusively.

Questions

1. How should the first line on this job be set?
2. How should the second and following lines be set?
3. Will the hanging indention require more or fewer lines?

JOB NO. 13—INITIAL

This is the first step in type-setting with an initial letter. It is always referred to as "using an initial," because we use a large capital letter covering the depth of two or three lines to start the paragraph.

See that the spacing on the side of and below the initial is even. Spacing should not be too large.

Set the stick to 20 picas, and follow the copy carefully.

Put a lead between the lines.

PRACTICALLY all leading articles in magazines, chapters of books, pamphlets, folders, etc., are started with a capital letter, large enough to fill a depth of two or three lines. The rule is that all of the word started with an initial letter must be set in capitals of the same size type as used for the rest of the article.

Initials like the F, P, T, V, W, and Y require no space at the beginning of the first two or three lines, because the lower part of the initial is blank metal. Other initials require different spacing at the beginning of the lines.

Questions

1. How should the first word connected with an initial letter be set?
2. How should the second and third lines of a paragraph be indented to make room for the initial?
3. How is the spacing on the side and below the initial to be evened up?

JOB NO. 14—ENVELOP-CORNER

The following is an envelop-corner. Set the lines as they are in the copy and space the job out as it is now. When finished, tie it up and take a proof.

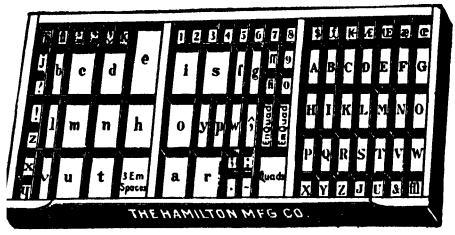


FIG. 14.—California Job-Case

Two faces of type are used on this job. The first line consists of 8-point small capitals of Lining Oldstyle. The second line consists of 14-point Old English. The third and fourth lines are in 8-point caps and small caps of Lining Oldstyle.

Here we have occasion, for the first time, to use the California job-case (Fig. 14). It is usual for all display-types to be placed in such cases. The 14-point Old English used on this job will be found in one of these cases.

Set your composing-stick to 13 ems of pica—the longest line in the job.

PRINTING DEPARTMENT

Bronx Continuation School

THIRD AVENUE AND 157TH STREET
NEW YORK CITY

Questions

1. How are the lines of this job to be set?
2. How much spacing should be placed between the various lines?
3. What are the names of the type used?

JOB NO. 15—BUSINESS-CARD

The following is a business-card. Set the lines as they are in the copy and space the job out as it is now. When finished, tie it up and take a proof.

The type used in this job is Copperplate Gothic, all found in California job-cases. The sizes are a combination of 6-point Nos. 1 and 2, 2 and 3, and 6-point No. 4 with 12-point No. 1 (for the name).

Set your measure to 18 ems of pica.

HOME ADDRESS: 863 EAST 176TH STREET, THE BRONX
TELEPHONE, TREMONT 3492

JOSEPH SMITH

INSTRUCTOR OF TYPOGRAPHY AND PRINTING
AT CITY COLLEGE OF NEW YORK

CONVENT AVENUE AND 140TH STREET NEW YORK CITY

Questions

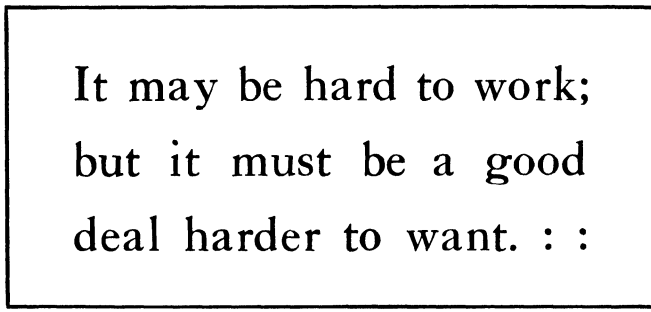
1. How should the first and second lines of this job be set?
2. What decides the amount of spacing to be used between the first and second groups of the job?
3. What kind of type is used on this job?

JOB NO. 16—PANEL

This is a panel job. Set up the reading-matter in 18-point type. Space it like the copy. Then put 2 picas all around, and use medium rule as a border.

Tie up the job, and take a proof.

Type used is 18-point Caslon—found in a California job-case.



Questions

1. How much space should be used around the type, to separate it from the border?
2. What size of type is used on this job?
3. What is used to produce the border effect?

JOB NO. 17—CALENDAR

This is a calendar job. Set up the figures in 10-point Kenilworth. Space it like the copy. Then put 1 pica all around, and use medium rule as a border.

Tie up the job, and take a proof.

MARCH, 1924

S	M	T	W	T	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

Questions

1. How much space should be used between the figures in this job?
2. How can the figures be made to line up with each other?
3. How much space is used to separate the type from the border?

JOB NO. 18—LETTERHEAD

This is a letterhead. Set the lines as they are in the copy and space the job out as it is now. When finished, tie it up and take a proof.

The type used on this job is Lining Oldstyle for everything but the name, and that is in Engravers Old English.

Two measures are required on this job. The measure for the telephone line and the two bottom lines should be 28 ems of pica—using 6-point slugs to space to full length. The measure for the center group should be 13 ems; and, after the group is set and spaced, it should be placed within the center of full measure of 28 ems, and spaced out with metal furniture on both sides.

Care should be taken that every line of the center group is "centered" on the others. For this purpose, the spacing on each side of line must be the same.

In spacing the lines, the small spaces must always be placed next to the type and the larger quads on the outside.

In taking proof, see that the lines of type are at the top of the paper, so that the job will look like a letterhead.

Telephone, Melrose 7861

DEPARTMENT OF EDUCATION

Bronx Continuation School

THIRD AVENUE AND 157TH STREET
NEW YORK CITY

Theodore W. Langenbahn, Principal

Printing Department
William A. Hildebrand, Instructor

Questions

1. What is the best method to be used in placing the center group in proper place in this job?
2. How are the first and last three lines to be set?
3. What type is used for the name?

JOB NO. 19—TICKET

This is a ticket. Set the lines as they are in the copy and space the job out as it is now. When finished, tie it up and take a proof.

The type used on this job consists of Engravers Old English and Lining Oldstyle. The line "Commencement Exercises" has spacing between the letters, so as to make it long enough for good typographical appearance. A 6-point ornament is used to separate the last line from the others.

Set your measure to 20 ems of pica. In setting the lines, see that every one of them is "centered" on the other; and place the smallest spaces next to the type.

In pulling a proof, care should be taken not to use too much impression; as that would spoil the typographical effect of the "Engravers' Old English" type and might break or injure some of the letters.

The Graduates of
The Mount Hope Public School, New York

REQUEST THE HONOR OF YOUR PRESENCE
AT THEIR

Commencement Exercises

ON

Friday, June 24, 1921, at 8:00 P. M.

IN THE AUDITORIUM OF PUBLIC SCHOOL NO. 53, THE BRONX
360 EAST 168TH STREET, NEW YORK

L. A. Beardsley, Principal

Questions

1. What is done to have the lines center on each other in this job?
2. What method is used to increase the length of line reading "Commencement Exercises?"
3. What is the size of the ornament used at the bottom of the card?

JOB NO. 20—BLANK

This is a blank job. Set the lines as they are in the copy, to 16 ems, and space the job out as it is now. When finished, tie it up and take a proof.

There are three different type-faces used on this job—Engravers Old English for the main head, Lining Oldstyle for the line above and the line below the main head, and Lining Oldstyle Italic for the other lines.

In setting the lines connected with rules, 6-point quads should be used above the rule and one lead below the rule. This, together with light rule, will make up to 10 points—the size of type.

A double rule is used around the job, with corner-pieces to connect. The margins within—between type and rule—are 2 ems of pica. Reglets or slugs may be used for this space.

THE MOUNT HOPE SCHOOL JOURNAL

Reporter's Pass

VALID FROM OCTOBER 1, 1923, TO JANUARY 31, 1924

*Name*_____

*Class*_____ *Section*_____

*Official Title*_____

*Signed*_____

Questions

1. What is done to secure the lining up of the rules with the type-matter of this job?
2. What type-faces are used on the job?
3. What method is used to get the proper connection in the corners of the border of this job?

Type should always be kept clean. After the proof of a job has been pulled, it should be washed with benzine. A soft brush is used for that purpose. (See Figs. 15 and 16.)

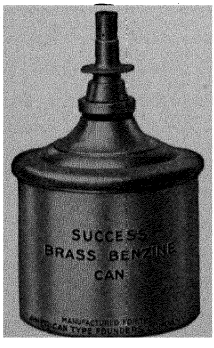


FIG. 15.—Benzine-Can

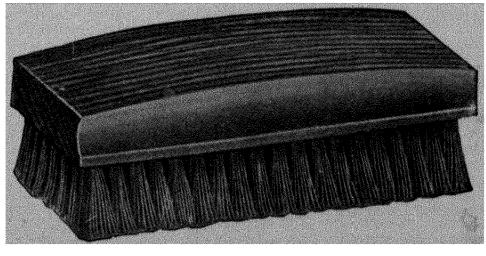


FIG. 16.—Benzine-Brush

UNIT II

PRESSWORK, STONEWORK, ETC.

PRESSWORK

JOB NO. 1—THE PLATEN PRESS

JOB NO. 2—TAKING CARE OF PRESS

JOB NO. 3—FEEDING THE PRESS

JOB NO. 4—MAKING READY ON PRESS

STONEWORK

JOB NO. 5—IMPOSITION

JOB NO. 6—LOCKING UP A FORM

OTHER ACTIVITIES

JOB NO. 7—PAPER-CUTTING

JOB NO. 8—WIRE-STITCHING

UNIT II

PRESSWORK, STONEWORK, ETC.

After the student has finished Unit I, he may take up some of the other phases of the trade—such as stonework, presswork, etc.

Presswork

JOB NO. 1—THE PLATEN PRESS

Platen Presses include all types of presses in which the impression is taken on a flat surface and from a flat type-form.

The Platen—from which the press gets its name—is the metal surface which receives the impression. It is flat and smooth on top, and shaped to fit the shaft upon which it rocks below. The upper surface is held in position by means of four adjusting screws, for the purpose of equalizing the impression. At the upper and lower edges of the surface are clamps which hold the tympan in place. Since the impression is taken by the platen, it must be kept clean and smooth and be capable of adjustment for variation of type-forms.

The Grippers are long metal blades, which automatically close against the platen when the press closes. They are held in place on a track, at the lower edge of the platen, by bolts, which allow them to be moved to the desired position. The purpose of the grippers is to prevent the inked type from pulling the printed sheet from the platen when the press opens.

The Bed.—The flat metal surface which supports the chase and the type-form is known as the bed of the press. It is directly opposite the platen, so that the two may close together to give the impression.

The Form is locked into place on two grooved lugs at the bottom, and clamped at the top. The clamp is held down by

a strong spring to prevent its loosening while the press is in motion. The bed moves forward to meet the platen.

Ink Disk.—The ink disk found on most platen presses serves as a distribution-plate for the ink. It is centered on a shaft, which enables it to revolve when the press is in motion. The ink is fed onto the disk either by hand or by an ink fountain, and is distributed over the plate by rollers which pass over it.

Rollers.—There are usually three rollers on the Gordon press. These serve two functions—to distribute the ink upon the disk and to carry the ink over the type-form.

Throw-Off Lever.—The throw-off lever, which is a lever located at the left side of the platen, is used for the purpose of getting an impression. When it is brought forward, the impression may be made; when it is brought back, no impression can be made.

Questions

1. What is a platen?
2. What are grippers used for?
3. How is the ink distributed over the type?

JOB NO. 2—TAKING CARE OF PRESS

Oiling the Press.—Every press which is used daily should be oiled before starting the day's work. Every oil-hole, joint, and bearing should be kept continually lubricated to prevent friction and wear. The motor-cups should also be oiled. There are usually two of these to every motor.

Cleaning the Press.—The press should be cleaned at the end of the day's work, so that the ink will not dry on the disk and rollers. Ink eats holes in the rollers when allowed to dry in them.

When there is not sufficient time to clean the press, oil may be used on disk and rollers. It may stay that way overnight without detriment, and may then be washed in the morning.

Benzine is the most popular fluid used for washing the press. First a dirty rag is used to get the ink off the disk

and rollers, and later a cleaner rag may be used for drying all parts.

Questions

1. How should the press be oiled, and why?
2. How often should the press be cleaned?
3. How may oil be used on the disk and rollers when there is no time for cleaning the press?

JOB NO. 3—FEEDING THE PRESS

The stock to be fed is placed on the feedboard at the right of the press, in the position best suited for feeding against the pins with the least turning of the sheets (see Fig. 17).

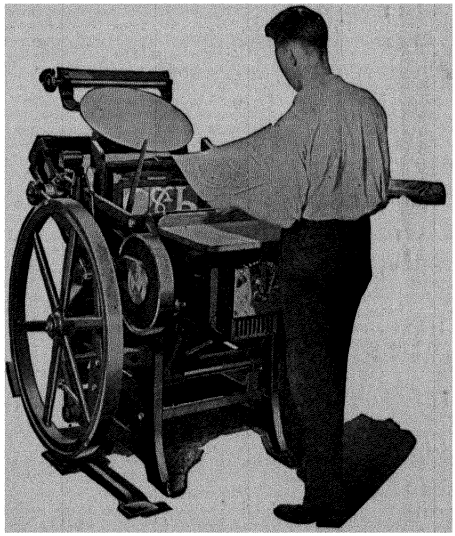


FIG. 17.—Feeding the Press

Before starting the press, see that everything is ready. The grippers should be properly set, the throw-off lever in the right position, and the tympan clean.

To start the press, it is necessary to pull out the handle which releases the power. Then the switch to the left is moved to the right until the proper notch is reached.

It is advisable to help the motion of the press by turning the flywheel with the hand, thus relieving the strain on the motor—which is much greater at the start than during the regular working of press.

The sheet of paper is placed on the platen of the press to meet the pins on two sides. When the sheet is properly adjusted, the throw-off lever, on the left of press, is pulled. This allows the impression to be taken. The lever should not be pulled, however, until the press is wide open.

After the impression is taken, the lever should be restored to its original position. The same procedure is followed with all succeeding sheets, until the job is finished.

The feeder should watch the appearance of the sheet. If the impression gets too light, more ink should be placed on the disk. If the printing is not straight on the sheet, the pins should be adjusted.

When the press is to be stopped, the motor-switch should be moved entirely to the left; then the handle is to be pushed in; and, finally, the feeder is to put his foot on the foot-brake. The last act stops the press instantly. This, however, should be done when the press is wide open and the rollers are down.

Questions

1. What is the feedboard?
2. How is the press started?
3. How should paper be fed?

JOB NO. 4—MAKING READY ON PRESS

After the form is inserted into the press, the first thing to do is to see that the grippers are clear of the type. An impression taken over the grippers will smash the type.

The paper clamped over the press, which is known as "tympan," should be smoothed out, and any particle of dirt removed, as a very minute particle may cause a difference in the impression. Gage-pins should be taken out also.

Making ready is for the purpose of preparing the form, so that it will print on the proper place on the sheet and will

show up well when printed—that every letter, character, and other feature will be brought out to advantage.

It is necessary, first of all, to take a proof on the platen of the press. Then the two margins—at the head of the job and to the left of it—are to be ascertained, and lines are to be drawn at the limits of these margins. At these limits the gage-pins are placed—two on each line—so that the sheet which is fed will be held in place by the gage-pins.

The next step is to find just the amount of packing necessary, so that there will be just sufficient impression of the job on the paper—neither too much nor too little. It may be necessary to add or take out some sheets of paper from the platen of the press.

It is usually necessary to place one sheet of pressboard between the papers of the packing. When printing card stock, the pressboard is not used.

After that is done, a proof is taken and carefully scrutinized. Whenever type does not show up well, it is raised by pasting a piece of thin paper on drawsheet of the tympan. Where matter gives too much impression, that spot is to be lowered by cutting out one layer of paper in the drawsheet of the press. Gage-pins may be moved until the job prints just exactly on the proper place of sheet.

Questions

1. What is the object of make-ready?
2. How is a job made ready?
3. What are gage-pins?

STONEWORK

JOB NO. 5—IMPOSITION

Imposition is the process of arranging type-forms in the desired position for printing, so that they may be locked up in readiness for the press.

Locking up of forms requires a number of tools and materials.

The Imposing-Stone.—This is the place on which the stonework is done. It consists of a large flat slab of hard stone

or steel, with polished surface, which is supported upon a wooden or steel frame. (See Fig. 18.)

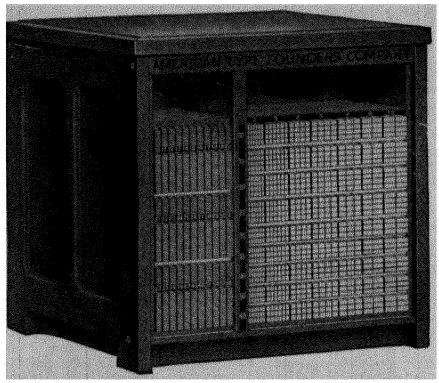


FIG. 18.—Imposing-Stone

Chase.—This is the metal frame within which the type-form is locked up. It is rectangular in shape, and is usually made of

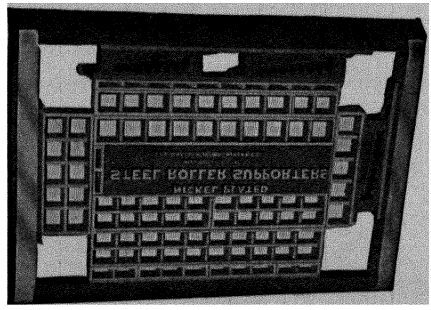


FIG. 19.—Chase—with Job Locked Up

welded steel. The chase is made to fit the bed of the press—where it must be attached for printing. (See Fig. 19.)

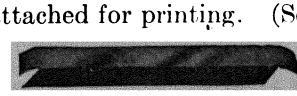


FIG. 19a.—Roller-Supporter

Roller-Supporters.—These are strips of steel plate, bent at right angles, which may be inserted in the ends of the chase

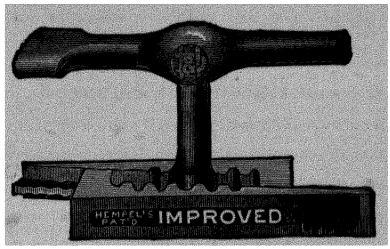


FIG. 20.—Quoins and Key

to protect the rollers on the press from being cut by ruled forms and to keep them from sinking too far into the type. (See Fig. 19a.)

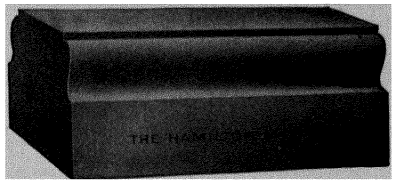


FIG. 21.—Type-Planer

Wood Furniture.—The blocks of wood which are built around the form to hold it securely in place within the chase are called "wood furniture." The blocks are graduated according to the pica system in both length and width, and are

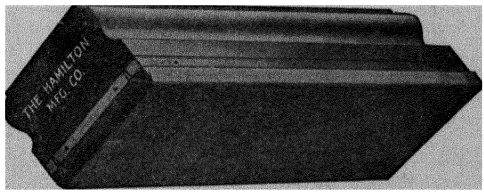


FIG. 22.—Proof-Planer

about three-fourths of an inch in thickness. The lengths are indicated at the end of each piece, and they range from 10 up to 60 picas, and sometimes more. Lengths come in 10, 15, 20, 25, 30, 40, 50, and 60 picas. The widths are 2, 3, 4, 5, 6, 8, and 10 picas.

Quoins and Key.—Quoins are locking-devices used to lock the forms in their place in the chase, and the key with which they are tightened is known as a "quoin-key" (see Fig. 20).

Type-Planer.—The type-planer is a solid block of hard wood, with a smooth surface at the bottom for planing the type before locking it up. (See Figs. 21 and 23.)

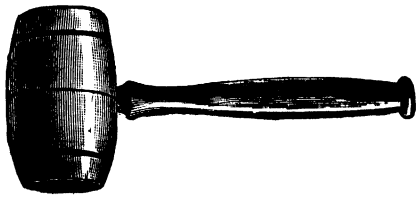


FIG. 23.—Mallet

The Proof-Planer, which is sometimes used for beating a proof on the stone, is a planer like the type-planer, with a felt covering. (See Fig. 22.)

Questions

1. What is imposition?
2. What is a chase and what is it used for?
3. What are the quoins used for?

JOB NO. 6—LOCKING UP A FORM

The imposing-stone must be kept in good condition. Everything on it has its place, and should be put away after using.

In locking up a job for the press, the first thing is to place the job within a chase—for the large or small press—in accordance with instructions. Then wooden furniture, to fit the job, is used to build around it, until the space is all taken care of.

Quoins, for tightening the job in the chase, are to be put on the right-hand side and also to the front of the job.

On each side of the quoins is to be placed a piece of reglet, which is for the purpose of preserving the wooden furniture coming in contact with the metal quoins.

The job is to be planed down before it is locked up; but it must not be tight in the chase when that is done. Planing is for the purpose of making the surface of type-matter even. (See Fig. 24.)

Locking up the job should be done gradually—tightening the quoins a little at a time, until they are all tight. Care should be taken not to tighten the quoins too much, as that may cause the springing of the chase.



FIG. 24.—Planing Form

The position in which the form is to be locked up in the chase depends upon the general shape of the form. A form should always be placed near the center of the chase, because in this position it will receive the most even impression on the press. In case two or more forms are to be locked up in the same chase, they should be as nearly centered as possible. The shape of the form will determine the way it will be placed in the chase.

The head of the form should always be placed at the left or bottom of the chase, depending upon the shape, because these are the feeding-sides, or the sides to which the sheets are fed in the press.

There are two methods by which forms may be locked up: One is the method of placing "furniture within furniture." This may be done when the form is of a size even with the furniture, or, at least, where one of the dimensions of the form is of the same size as the furniture. In this case, a piece of furniture the same length as the width or depth of form is placed on each end of the job, and a piece of furniture is placed on the other two ends so that they will overlap.

The other method of locking up is called "the chaser method." The difference between this and the preceding

method is that the furniture in this method is longer than the size of the form, and the furniture placed immediately around the type overlap each other. In this way, the furniture may slide from any side, and, when locked, it will bind the form on all sides.

The best method for building the furniture around a form is the so-called "pyramid method"—which means that each succeeding piece of furniture is longer than the other. This will distribute the stress on the side of the chase over a longer space, and will not only hold the type more securely, but will also lessen the possibility of cracking the chase.

Questions

1. Where must the quoins be placed in locking up a job?
2. How is a plane surface secured on a job?
3. How should the job be tightened?

Other Activities in the Printing Class

Students in printing should also learn how to use the paper-cutter and stitcher—both of which are constantly needed in the product of printing.

JOB NO. 7—PAPER-CUTTING

The paper-cutter consists of a bed, upon which the paper is placed and measured, a clamp for holding it in position, and a cutting-knife (Fig. 25).

When paper is to be cut a certain size, the gage is adjusted first to one of the sizes. This is done by turning the small wheel in front. Then the little screw below the cutter is tightened, so that the gage will not move.

A brass rule in the bed of the cutter extends backward and forward from the cutting line, and is graduated in inches and fractions of an inch. In adjusting the gage, this rule will show the exact dimension.

After adjusting the gage, the paper is placed close against the backslide of the cutter, and the binder-screw (wheel on top of the cutter) is tightened down by turning the wheel.

The lever on the side of the cutter is then unlocked and brought down to cut the paper.

When one size is cut, the gage is adjusted for the other size of the dimensions, and the same procedure is followed.

When both dimensions are cut, the waste paper is removed from the cutter and the cutter locked up.

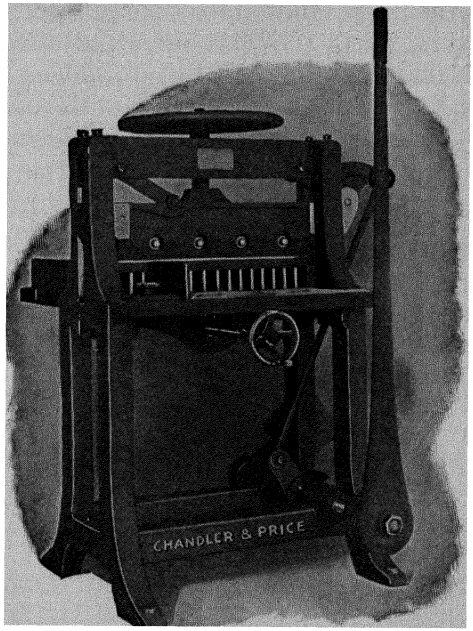


FIG. 25.—Paper-Cutter

It is always advisable to have a strip of heavy cardboard below where the paper is to be cut, to avoid spoiling the last few sheets.

Before cutting the paper, it is necessary to figure the best way to cut it, so that there may be the least amount of waste.

Questions

1. How is the gage on the paper-cutter adjusted?
2. How does the binder-screw work?
3. How is the hand-lever used in cutting paper?

JOB NO. 8—WIRE-STITCHING

The stitcher (Fig. 26) is for the purpose of binding together a number of sheets of paper in booklet form. It is worked

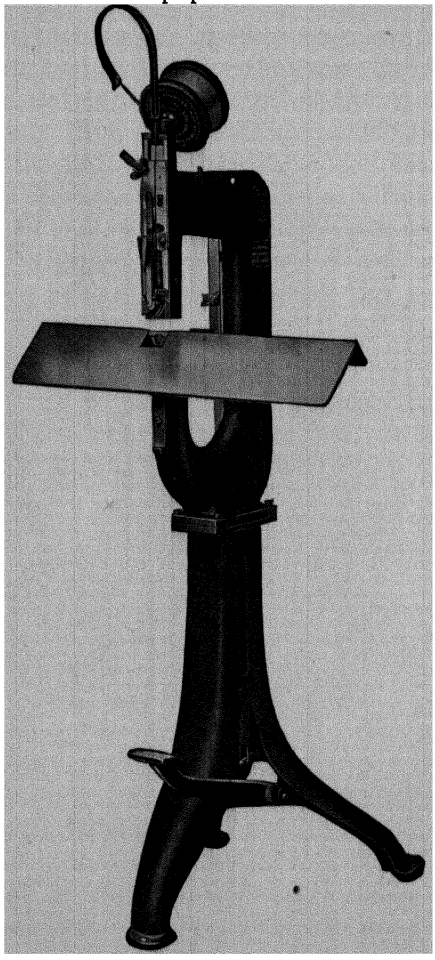


FIG. 26.—Wire-Stitcher

by foot-power, and releases a wire-staple with every action of the foot on the treadle.

This machine will operate both the saddle-stitch and the side-stitch. The saddle-stitch binds together the sheets laid one within the other, while the side-stitch binds the sheets flat on the side.

The sheets of paper are to be placed so that the staple will fasten the paper in proper place; then the foot presses on the treadle and is lifted up slowly, together with the treadle. The treadle must not fall back of its own accord.

The stitcher may be regulated to bind different thicknesses of paper by a device on top, which is connected with a screw. It is first necessary to open the screw, so that when the foot presses down on treadle the gage is set properly. The screw is then tightened, and the staples cut to the proper length for the purpose.

Questions

1. How is the stitcher operated?
2. What is the difference between the saddle-stitch and side-stitch?
3. How is the stitcher regulated to take care of different thicknesses of paper?

UNIT III

TYPOGRAPHY

JOB NO. 1—CHARACTERISTICS OF ROMAN TYPE-FACES
JOB NO. 2—ABOUT BODY-TYPES
JOB NO. 3—LETTERING
JOB NO. 4—DESIGN OF COMMERCIAL FORMS
JOB NO. 5—ORIGINAL DESIGNS
JOB NO. 6—ADVERTISING DISPLAY
JOB NO. 7—CHOOSING THE DISPLAY
JOB NO. 8—TYPE OF THE ADVERTISEMENT
JOB NO. 9—DEVELOPMENT OF DISPLAY
JOB NO. 10—DISPLAY-TYPES FOR VARIOUS PURPOSES
JOB NO. 11—ORIGINAL DESIGNS, NO. 1
JOB NO. 12—ORIGINAL DESIGNS, NO. 2

UNIT III

TYPOGRAPHY

THE PLANNING AND DESIGN OF TYPOGRAPHIC FORMS

In the work in typography, lettering is the first subject to be taken up. In order that the student may receive a proper appreciation and understanding of type-faces and develop his ability to draw these faces, it is necessary for him to study some of the characteristics of these and the distinctions between the different classes. Job No. 1 deals with the characteristics of type-faces.

JOB NO. 1—CHARACTERISTICS OF ROMAN TYPE-FACES

The Serif.—The serif is that portion of the type-face indicated by the small black sections on the tops and bottoms of characters.

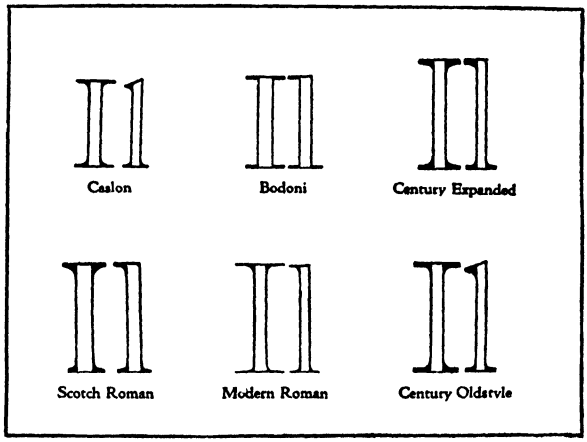


FIG. 27.—The Black Sections Indicate the Serifs, and Show the Differences in Serif-Construction on Several Well-Known Type-Faces (*From Bullen*)

The fact that there are so many different faces of types is due to some extent to the manipulation of the serif—which

has a wonderful tendency to give character and distinction to a type-face in its variety of changes. By changing the length, thickness, direction, and curve of the serif, the appear-

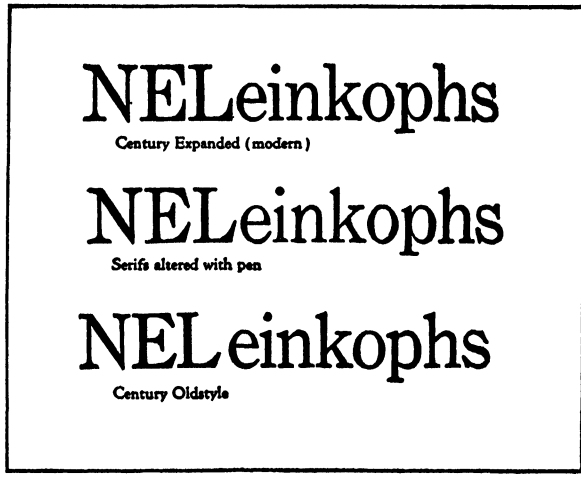


FIG. 28.—By Altering the Serifs, "Modern" Type Is Changed to "Old-Style" (*From Bullen*)

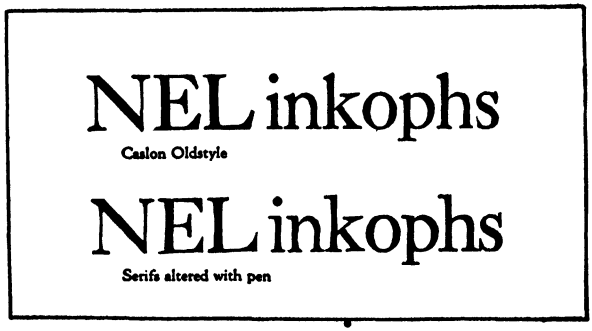


FIG. 29.—By Altering the Serifs, "Old-Style" Type Is Changed to "Modern" (*From Bullen*)

ance of the type-face may be entirely changed. It is by the serif that the distinction between Oldstyle and Modern Roman is recognized. (See Figs. 27, 28, and 29.)

Thick and Thin Strokes.—Block or Gothic letters have no contrast in their formation. The lines throughout the letter are alike. In almost every letter there exists a combination of thick and thin strokes.

The difference between thick and thin strokes should be as two to one. Where this is exaggerated, the result is not agreeable (as is exemplified in some of the types of the nineteenth century). Generally, the rule is to have all the vertical strokes thick (except in "M," "N," "U"), and all horizontal strokes thin. Diagonal strokes running from left to right are thick, except "Z." (See Fig. 30.)

A B C D E F G H I J K L M N O P Q
R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
How it appears assembled

FIG. 30.—Illustration of Thick and Thin Strokes

Ascenders and Descenders.—Not a little of the beauty of the Roman type-faces lies in the ascending and descending strokes, and one reason why our types are becoming more beautiful is because the proper proportions of these strokes are being returned to the characters. (See Fig. 31.)

Bodoni has said: "Divide the body of the type into seven parts, and let two at the top and two at the bottom be for ascenders and descenders and three in the middle for the rest of the letter." Cloister Oldstyle and Caslon Oldstyle types approximate the proportions given by Bodoni.

bcdefghijklmnop How it appears assembled

FIG. 31.—Illustration of the Formation of the Letters

Questions

1. What is the serif?
2. What is the ratio between thick and thin strokes in the ideal type-face?
3. What is Bodoni's rule regarding ascenders and descenders?

JOB NO. 2—ABOUT BODY-TYPES

Legibility of Type-Faces.—The most important requisite of type-matter is that it should be easy to read, and this is attained not only in the design of the type but also in the proper use of the type.

In the matter of the selection of body-type, Cheltenham Oldstyle and Kenilworth Oldstyle are more suitable for long, narrow pages and columns. Bodoni Book is also more adaptable for narrow pages. Caslon Oldstyle and Cloister Oldstyle are best for normal and wide measure. (See Figs. 32a, b, c and d.)

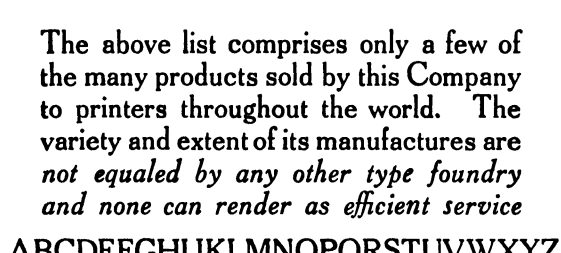


FIG. 32a.—Kenilworth Oldstyle

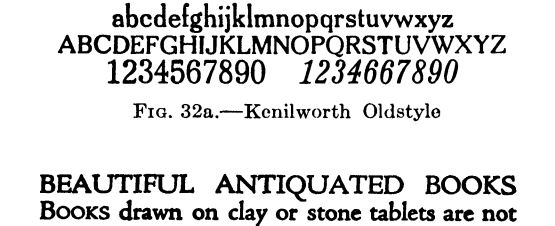


FIG. 32b.—Cloister Oldstyle

Such has been the patient sufferance of these colonies, and such is now the necessity which constrains them to alter their former systems *of government. The history of the present King of Great Britain is a*

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890

FIG. 32c.—Bodoni Book (Modern)

Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and, accordingly, all experience, hath shown *that mankind are more disposed to suffer, while evils are sufferable, than to right them-*

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 *1234567890*

FIG. 32d.—Caslon Oldstyle

Length of Lines.—The matter of the length of line is another important consideration. Educators advocate a length no greater than 4 inches as best calculated to prevent eye-strain and promote an easier reading page. Other specialists advocate a line no longer than 3½ inches for ordinary reading type. Of course, when the size of type is larger, the length of line may be longer. The length of line advocated above is for 10-point type—the usual size used for books and magazines.

The proper length for each size of type may be ascertained by taking as a guide the alphabet of the type in question. One alphabet and a half is considered to give the desired length. (See Figs. 33a and 33b.)

Points		Length of Line, Picas
8	abcdefghijklmnopqrstuvwxyzabcdefghijklm	10½
10	abcdefghijklmnopqrstuvwxyzabcdefghijklm	13
11	abcdefghijklmnopqrstuvwxyzabcdefghijklm	15
12	abcdefghijklmnopqrstuvwxyzabcdefghijklm	17½
14	abcdefghijklmnopqrstuvwxyzabcdefghijk	19½

Fig. 33a.—Caslon Alphabets

Points

14 Type should be easy to read, as well as good-looking, and must not strain the eyes of the

12 Type should be easy to read, as well as good-looking, and must not strain the eyes of the

11 Type should be easy to read, as well as good-looking, and must not strain the eyes of the

10 Type should be easy to read, as well as good-looking, and must not strain the eyes of the

8 Type should be easy to read, as well as good-looking, and must not strain the eyes of the

Fig. 33b.—Caslon Oldstyle Set to Proper Line-Lengths

Questions

1. What are the distinctions between Cloister Oldstyle, Bodoni Book, and Caslon Oldstyle?
2. What is the ideal length of line for book purposes?
3. How is the length of line regulated for the different sizes of type?

JOB NO. 3—LETTERING

For lettering, the use of the typefounders' specimen books are found to be quite effective. Below is shown the formation of the letters as they usually appear. (See Fig. 34.)

A B C D E F G

H I J K L M N

O P Q R S T U

V W X Y Z & $

1 2 3 4 5 6 7 8 9 0

a b c d e f g h i j

k l m n o p q r s t

u v w x y z ff fi fl

ffi ffl . , - ‘ ’ : ; ! ?

FIG. 34.—Formation of Letters of the Alphabet

Bodoni's Rule.—In lettering, Bodoni's rule should be followed. The space should be divided into seven parts—allowing two parts for the ascenders, two parts for the descenders, and three parts for the body of the letter, as follows:

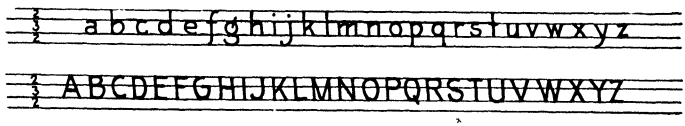


FIG. 35.—Hand-Lettering

The Sizes of Type.—The student should make a study of the various sizes of types as they appear in print and try to imitate, as nearly as possible, the various sizes. (See Figs. 36a, b, c, d, e, f, g, h, and i.)

EMBARKED
Honors Guard

FIG. 36a.—36-Point Strathmore

GIVE CHECKS
Rehearses Playlet

FIG. 36b.—30-Point Strathmore

MARKS POSITION
Distinguished lawyer
attending conference

FIG. 36c.—24-Point Strathmore

REBUILDING EDIFICE
Numerous workmen begin
erecting necessary scaffolds

FIG. 36d.—18-Point Strathmore

REACHED BORDER
Notorious bandits elude
sheriff after long pursuit

FIG. 36e.—14-Point Strathmore

PRODUCES EVIDENCE
Enthusiastic attorney makes speech favoring plaintiff, and is awarded proper judgment

FIG. 36f.—12-Point Strathmore

INTERESTED EXHIBITORS
Largest assortment of models at automobile show denotes quick development for motor industry

FIG. 36g.—10-Point Strathmore

MADE GENEROUS CONTRIBUTION
Celebrated philanthropist politely declines office of vice-president of newly organized charitable society, but makes large donation

FIG. 36h.—8-Point Strathmore

DESIRED IMPROVEMENTS ARE PROMISED
Several progressive merchants demanding municipal authorities to expedite construction of public market building, which should have been completed months ago but is delayed because of unjustified controversy

FIG. 36i.—6-Point Strathmore

Questions

1. How many parts of the space does the lower case "g" occupy?
2. How many parts of the space does the capital "Q" occupy?
3. Which letters of the lower case have ascenders and descenders?

JOB NO. 4—DESIGN OF COMMERCIAL FORMS

When the student has become familiar with lettering, he learns something about the reason and necessity for the planning and design of typography and how to go about producing a design. The first job to take up is the imitation of some commercial forms, and then he should draw something from manuscript copy.

Modern Typography.—The typography of today is far superior to that of former times, and it is constantly improving.

One of the main factors in the production of good work is the layout-man. His duty is that of preparation. If nine-

tenths of the production of the printers is poor, it is due to the lack of preparation by the layout-man.

Quality in printing is not accidental. It is due to careful thought—which always pays in the end. The office which gets a reputation for good work is sought by those who want good work and are willing to pay for it. There is such a thing as "shop style," which gives an office its individuality and character. The printing office, in order to have a definite place in the community and a standing in the trade, must have a distinctive style all its own—such as will interest a certain class of buyers. This style should be adhered to as far as possible—always, of course, taking into consideration the customer's views, ideas, and preferences.

In modern printing, the specified dummy has found quite a place, and is now used to good advantage. The dummy tends to give the prospective customer an idea as to the probable appearance of the job when finished.

For instance, it becomes known to the trade, either through the buyer of printing or otherwise, that a business firm is in the market for a catalog, booklet, or other piece of work. Several printers may be asked to submit a dummy, which should give the prospective customer some idea as to their ability to produce something satisfactory for his purposes. The dummy which proves most to his taste and expresses his views will be accepted, and the printer submitting it will probably get the job.

The dummy is, of course, not always used as a means of competition. The buyer may ask his printer to submit a dummy for the purpose of coming to an understanding with him as to how to arrange and prepare the job. This dummy may be changed and corrected by the customer until it proves to his liking, when he will contract for it with the printer.

A dummy, to be acceptable, requires careful and painstaking work on the part of the layout-man. The layout-man should, therefore, have, besides a thorough knowledge of modern ideas of typography and artistic ability, also a pretty good idea of the particular customer's taste and requirements, a knowledge

of his shop style, the equipment at hand, and the types and ornaments best adapted for the work in hand.

Layout of Commercial Work.—The planning and layout of commercial work is, of course, much more simple than that of booklets, catalogs, etc., but a great deal of care may be given to these for good results.

In planning the work the lines of the text should be drawn, as far as possible, in imitation of printing, and should be made approximately the size of the type to be used. The correct wording need not be given on the layout; the copy will serve for that purpose.

The paper used for the layout should approximate in size that to be used on the job. If that is not done, a line may be drawn around to indicate the size of paper.

Borders and ornaments need not be drawn with precision. A mere suggestion of them is sufficient for the small jobs.

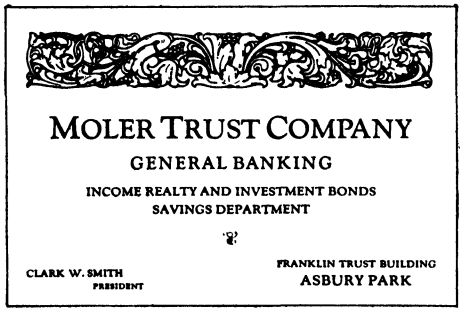


FIG. 37.—Business-Card

In elaborate dummies, these are usually pasted from a proof taken for that purpose.

The sizes and kinds of types are usually indicated on the layout or dummy.

Work in Imitation of Commercial Forms.—The student should try to imitate these commercial forms as nearly as possible. (See Figs. 37 and 38.)

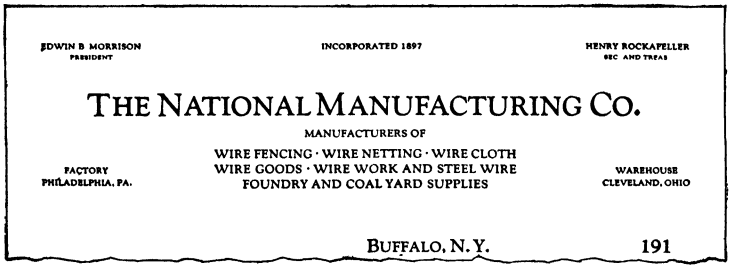


FIG. 38.—Letterhead

Questions

1. What are the duties of the layout-man?
2. What is "shop style?"
3. What is a "dummy?"

JOB NO. 5—ORIGINAL DESIGNS

Commercial Designs.—When the student has had a little training in imitating typographical constructions, he next

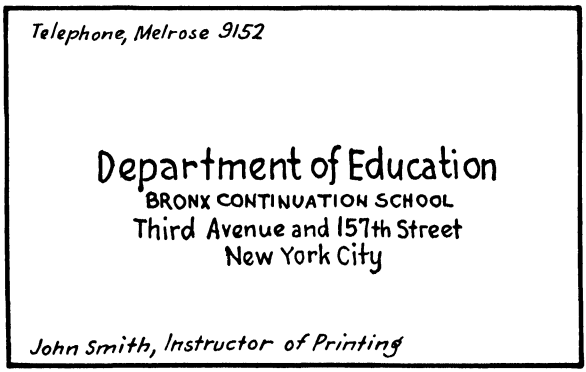


FIG. 39.—Business Card

makes original drawings. A few commercial forms are used for that purpose. The student may use his judgment in planning and designing the forms. (See Figs. 39, 40, and 41.)

The Matter of Consistency.—The importance of layout is quite apparent when the matter of consistency is considered.

An illustration of incongruous results in printing may be had in a case where a number of pieces of commercial work come into the printing office, and are turned over to various workmen without previous preparation. The result is that no two pieces

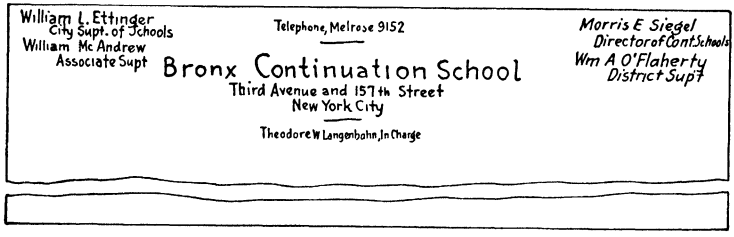


FIG. 40.—Letterhead

of work are similar—a thing which should be avoided in modern typography.

The Layout of Larger Jobs.—The laying out of a booklet or catalog requires a great deal more effort than a simple

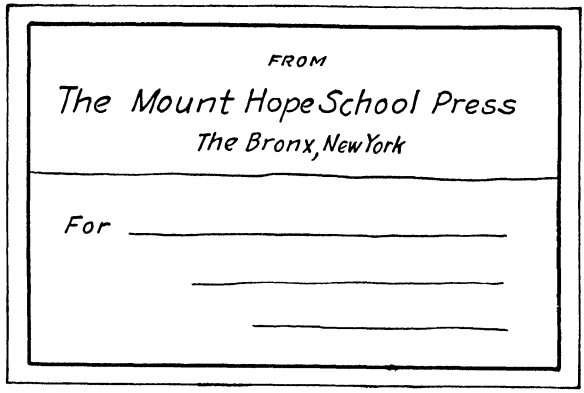


FIG. 41.—Package-Label

piece of commercial work. A number of things must be taken into consideration.

1. *Paper.*—The paper to be used on the job should be of the proper quality and that most suitable for the work in

hand. The size of paper should be considered with regard to economy, so that there will be as little waste as possible.

2. *Cover-Stock.*—The cover-stock should harmonize with the paper used for the inside, and should be cut a little larger, so as to overlap the inside pages.

3. *Type-Page.*—The type-page is determined by the size of paper used—allowing liberal margins. The amount of margin often influences the attractiveness of the printed page.

4. *Pasting of Printed Matter.*—In order to determine what the appearance of certain type and the margins will be, it is advisable to cut some printed matter of that type from another source and paste it on the dummy—allowing the proper margins.

5. *Computation of Space.*—The layout-man must figure out the size of type that should be used on a job. This he will find by taking into consideration, first, the size of type-page; second, the amount of copy; third, the number of pages which the book is to contain.

There are computation-tables showing the number of words of a given size type that will go into a given space. There is also a way of figuring this out without a computation-table. When he has found out the number of words contained in the copy, he can then proceed to determine the number of words to each page, and, finally, the size of type which will conveniently go into that page—with or without leads, as the case may be.

6. *Illustrations.*—Where illustrations are to be used, it is necessary, of course, to determine the amount of space needed for these, and then deduct that amount before figuring on the type-space.

7. *The Dummy.*—The dummy, after it is laid out, with all important details properly taken care of, is submitted to the customer, who should get a pretty good idea from it as to its probable appearance in the completed state. He may accept it, or make certain suggestions for alterations.

When the job has been secured, the dummy is sent to the composing-room with the copy, where it is used as a guide for the men to follow.

Questions

1. What is the reason for the layout of a job?
2. How is the size of type-page determined?
3. What does computation of space mean?

JOB NO. 6—ADVERTISING DISPLAY

Advertising display offers to the student the greatest amount of opportunity for acquiring knowledge of typography. Every phase and element of design is found there, and a knowledge of that work is helpful in the construction of any typographic forms.

It is necessary, first of all, to study and understand the object of the advertisement before venturing on the practical work. It is also useful to become familiar with the various rules governing the construction of an advertisement—so as to have some basis and foundation from which to plan the work.

The Advertiser.—The advertiser has a message which he wishes to deliver to the public; and the success of his advertisement lies in his ability to deliver that message to the best advantage. It is far easier to communicate one's thoughts and views through the spoken word than to describe the message properly by way of the printed page. Eloquence of accentuation and emotion, enthusiasm, emphasis, and all the other possibilities of the human voice must depend, in print, upon the display which may be secured with type, ornamentation, and color.

The first consideration of the advertiser is to judge his readers properly. Here he has a more difficult task than the speaker, who has his audience immediately before him and is thereby better able to judge what to say to them and how to say it.

Type-Display.—Although the matter of type-display has developed wonderfully within the past fifty years, there is still a great deal of room for improvement in the matter of finding proper expression for the many points to be brought out in an advertisement.

It is possible through the manipulation of types to emphasize certain lines more than others; it is possible to make an advertisement attractive to the reader by good arrangement and grouping; it is also possible to make an advertisement pleasing through good reading-matter.

Adapting an Advertisement to a Purpose.—The greatest study is involved in fitting the advertisement to the particular purpose which it is intended to serve; and, since there are innumerable kinds of goods to advertise, and each kind of goods may again be subdivided into many different classes to serve different purposes and to express various views, sentiments, and plans, the designs of advertisments present the greatest possibilities for original thought and new creations.

1. *Literary Part.*—The first consideration in the matter of preparing an advertisement must be given to the message which is to be delivered to the public, and this task, of course, belongs to the advertiser or his agent.

2. *Type-Interpretation.*—To interpret that message properly in type is the second element, and here is where the typographer exercises his judgment as to the proper layout and arrangement.

3. *Selection of Type.*—The proper selection of the style of type—light, medium, or bold—in accordance with the requirements of the subject-matter and the taste of the public it is to reach is also essential.

4. *Size of Type.*—Next comes the consideration of the size of types, which must be based on the size of the advertisement, the amount of the white space to be used, and the allowance of space for illustrations, ornamentations, and borders. Here the main lines, or display-lines, are selected first, and the size of the other lines, or body-matter, are based on the amount of space left.

5. *Borders and Ornamentation.*—Another problem is the selection of the border and appropriate ornamentation, if any. The selection of the border is usually left to the judgment of the typographer, who should realize the true function of that type-element.

The border should never be stronger than the type-matter. If anything, it is to show merely a modest frame and is never to be so heavy as to divert attention from the type-matter.

Next comes the matter of ornamentation—headpieces, centerpieces, tailpieces, etc.—which should also be regarded merely as a finishing touch to the advertisement, and, consequently, supply only the dressing in such a degree as not to crowd out or distract the attention from the subject-matter.

Rules are often used effectively for borders, cut-offs, and dashes; and in work where simplicity is essential, they are of greater advantage than fancy ornaments.

The Lines of the Advertisement.—1. *Title of the Subject-Matter.*—The most important line in an advertisment is usually the title of the subject-matter, and that line is usually set larger than the other display-lines.

Frequently there are lines representing subsidiary headings, which are set in type smaller than the main line.

2. *Name and Address.*—The name and address—which is usually at the foot of the advertisment—is set in rather small type. This type should be a little bolder than the type of the body—usually the same style of type as the head—but is set in smaller type, as a rule, than that of the body.

3. *Other Display-Lines.*—The other display-lines are set in size in accordance with their importance, and should always be treated in comparison with the main lines of the advertisement.

4. *The Catch-Line.*—Sometimes a catch-line beginning the advertisement is used as the most important line of display; and, while the subject-matter is emphasized, it takes a secondary position. The catch-line, in such cases, usually consists of a statement which is likely to attract the attention of the reader and lead him to continue to read the message of the advertisement. It is usually worded so as to make the reader curious and interested to know what follows.

5. *Catch-Line with Illustration.*—Sometimes such a catch-line is accompanied by an illustration relative to the catch-line. Good examples of this kind of advertising are the Rogers-Peet advertisements appearing in the daily newspapers.

Questions

1. What is meant by "type-interpretation"?
2. How is the size of body-type determined?
3. What is the function of the border?

JOB NO. 7—CHOOSING THE DISPLAY

The tendency to display too much is bad. Where much is displayed, nothing is particularly emphasized. This is a very important element to consider, as there seems to be a natural inclination to exaggerate the display—where a simple arrangement may be much more effective.

Contrast.—Contrast is perhaps a much more effective factor than is usually known. It is through contrast that the important line or lines of the advertisement can be emphasized sufficiently. If all lines were of the same strength, there would be no contrast, and, therefore, no display. A ten-story building in the downtown section of New York would hardly be noticeable; it would create absolutely no comment. But put that same building among the little structures of a village, and the conditions will be entirely different.

Contrast is depended on to give the effectiveness of the advertisement; and the distinctions between the lines must be made sufficiently strong to get the proper contrast. A slight difference in the sizes of lines will very rarely give the proper contrast. There must be a very strong distinction.

Another important feature to be remembered in the getting up of advertisements is to emphasize one thing at a time. In trying to bring out several features in one advertisement, nothing is accomplished. A reader gets confused when too many things are brought out in the same advertisement. There may be a fair chance of gaining his attention if one thing is said and emphasized; but his attention is lost entirely if there is an attempt to tell him too many things at the same time.

This is just as true with the display as it is with the copy; for any copy may be taken wherein many things are said and just one particular feature brought out forcibly.

The Plan of the Layout.—There must always be a definite plan from which to work. This plan should be decided on and drawn up after carefully reading the copy of the advertisement. This drawing is called a "layout."

There is a great advantage in experimenting with a layout before attempting to construct anything definite. The best possible results can only be attained by a preliminary vision of the probable appearance of the completed advertisement. By making a rough sketch, or skeleton, the proper sizes of types, arrangement, spacing, and margins can be figured out. After that, it becomes an easy matter to construct the advertisement.

Every advertisement may be set in several different arrangements, and it is well to try a few layouts before deciding upon the one which may be most acceptable under the circumstances.

The Skeleton of the Advertisement.—The first thing to do is to read the copy carefully and get a good idea as to the contents. Then several skeletons should be drawn, and the one which appears most attractive should be used as a model for a more finished drawing.

The Copy of the Advertisement.—To take a practical example, we are going to construct an advertisement for a book. The copy here is as follows:

The Principles of Design

By Ernest A. Batchelder

(Body Matter—14 Lines)

Price, $3.50

INLAND PRINTER COMPANY
632 Sherman Street
Chicago, Ill.

Construction of the Advertisement from Copy.—We are going to construct four skeletons, or layouts (shown below), from this copy—each a little different than the other—and

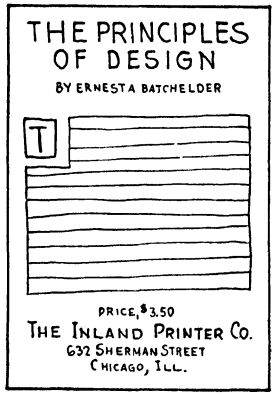


FIG. 42a

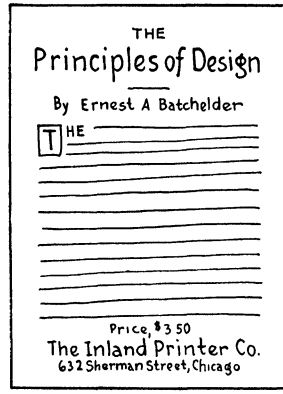


FIG. 42b

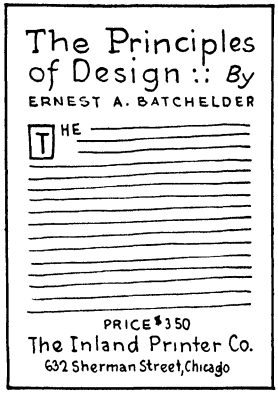


FIG. 42c

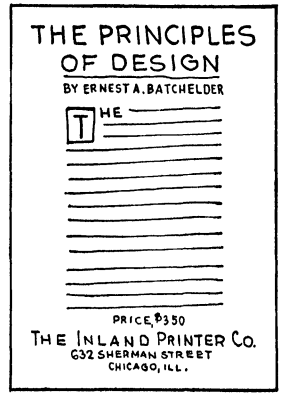


FIG. 42d

select the best one for a finished drawing. (See Figs. 42a, b, c and d.)

The Finished Advertisement.—Supposing we have found Skeleton 42b most desirable for our purposes, we then proceed to make a more finished drawing of that plan; and the advertisement is set from that design.

Questions

1. How should an advertisement be studied to be displayed most effectively?
2. How is a layout planned?
3. What is a skeleton of an advertisement and what purpose does it serve?

JOB NO. 8—TYPE OF THE ADVERTISEMENT

This lesson deals with the type of the advertisement. Here we learn how to create type-harmony and to select the proper faces and the proper sizes of type. We also learn to limit our display for the best results.

Choosing the Type.—An advertisement depends to a great extent for its effectiveness upon the type which is used. The type of the advertisement is like the dress of the person; and, in modern days, the outward appearance—which is mainly the result of dress—is of the greatest consequence in business as well as in society.

Just as one kind of dress will not fit every person alike—so we cannot expect that the type fitted for one particular kind of advertisement shall be adaptable to every other kind or class. Of course, certain types, and perhaps all types, will be adaptable for many different purposes; but there are certain kinds of type most adaptable for certain uses and no other.

Today the point has been reached where the most important element in the make-up of type is its legibility, or readability. We are not concerned with fancy types, as formerly; we want type that will be easy to read; and most types are constructed with that point in view.

Some types are easier to read than others. This is because of their various peculiar characteristics.

There are quite a number of light-faced body-types. They are divided into two large classes—the Oldstyle and the Modern Type. They are both known as the Roman type-faces.

The Roman Type-Faces.—For the body of the advertisement the Roman letter is the most legible, and, therefore, suggested. The Roman letter is best because (1) its long use has

become a habit and the type is, therefore, most natural and normal to the eye; (2) in legibility and distribution of color, it is superior to all others yet created. (See Figs. 43a, b, c, d.)

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws

ABCDEFGHIJKLMNOPQRSTUVWXYZ

1234567890

FIG. 43a.—10-Point Caslon Oldstyle

WHEN, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of

ABCDEFGHIJKLMNOPQRSTUVWXYZ

1234567890

FIG. 43b.—10-Point Lining Oldstyle

WHEN, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws

ABCDEFGHIJKLMNOPQRSTUVWXYZ

1234567890

FIG. 43c.—10-Point Scotch Roman

WHEN, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws

ABCDEFGHIJKLMNOPQRSTUVWXYZ

1234567890

FIG. 43d.—10-Point Bodoni Book

Light-Face, Medium-Face, and Bold-Face.—It has been found that proofreaders can read the light-face type much faster than any other, because that type is most legible. Although there are others who claim that the bolder types should be easier to read, because they offer greater contrast with the white paper, this is not a fact. The bolder faced type, if anything, is less distinct because there is less space between the letters and the eyes are unduly strained. (See Figs. 44a, b, and c.)

Every month *Fashion's Mirror* buys articles for hundreds of women who happen to be distant from metropolitan shops, or who like to have the benefit of skilled shoppers' advice. There is no service charge—we are happy to help you. Just mention the page and issue on which the things you want appear, tell us your

FIG. 44a.—Light-Face Type—10-Point Goudy

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of nature and

FIG. 44b.—Medium-Face Type—10-Point Bodoni

New and pleasing as the origins of our alphabet are in all their details, they are not any more fascinating than the different incidents by which these results have been gained: the patient working out of the meaning of rock inscriptions, the significance of which had altogether perished from the earth, with the following opening up of enormous vistas of human achievement through

FIG. 44c.—Bold-Face Type—10-Point Cloister Bold

Selecting Types for Display.—In selecting types for display, care should be taken to select types of the same character or family as the body-type. As a general rule, there are now

in existence all the needed kinds of types in one and the same family; as, for instance, the thirty mating types of Cheltenham and the many mates of Caslon—such as Caslon Oldstyle, Italic, Bold, Bold Italic, Condensed, Condensed Bold Italic, etc.

The following illustrations should be studied by the student. and sketches made, freehand, with pen and ink, in imitation.

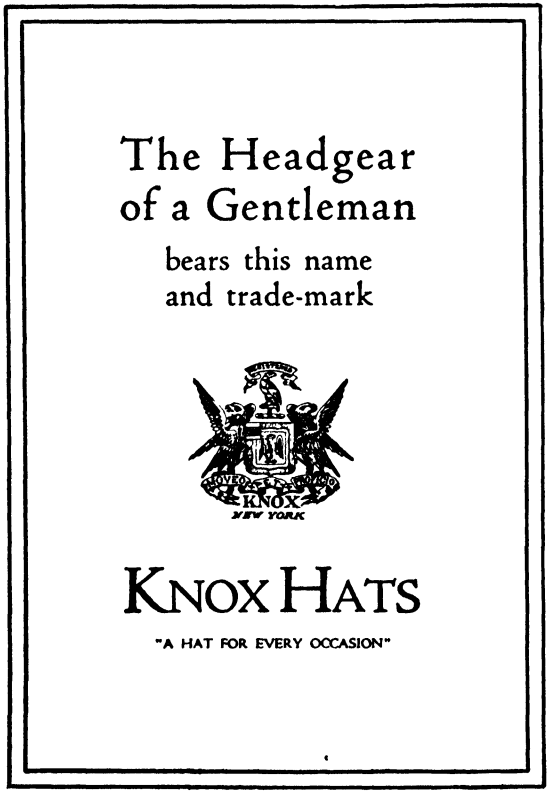
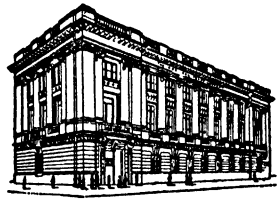


FIG. 45.—Name and Trade-Mark Emphasized



CO-OPERATION
WITH ATTORNEYS

Much of our trust business comes from attorneys who do not care to assume the financial responsibility and the burdensome detail of handling an estate, or feel that a trust company is better equipped to do so.

We aim to retain their services in connection with estates they are instrumental in bringing to us. Some testators in their wills mention the attorney they wish employed, a practice we commend

CAPITAL $2,000,000
SURPLUS $1,500,000

THE NORTHERN
TRUST COMPANY
LA SALLE AND MONROE STREETS

FIG. 46.—Roman Lettering and Roman Architecture

In Fig. 46, the illustration may be simply outlined, and the words "Illustration of Roman Architecture" placed within the outline.

For the advertisement below, several different borders should be tried—to find the one most fitted for it. Among the borders to be selected, we may try the single-rule, double-rule, and double border.



FIG. 47.—A Study in Advertising Values

Questions

1. What are the advantages of the Roman type-faces?
2. What determines the selection of light-face, medium-face, or bold-face types?
3. How should types for display be selected?

JOB NO. 9—DEVELOPMENT OF DISPLAY

The Need for Display.—Several generations ago it was the fashion to set advertisements severely, without any display. The advertisements did not even have heads. Following

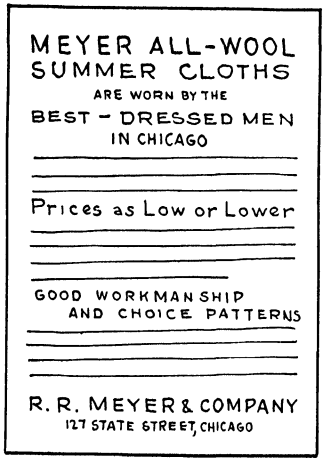


FIG. 48a.—Original Layout

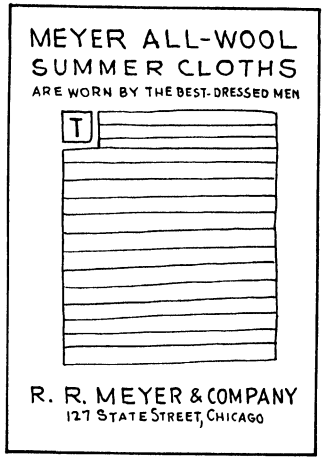


FIG. 48b.—Improved Layout

that period there came an era of typographical orgies, which pointed to the other extreme. The many different types—fancy and otherwise—and decorations used made it very hard for any reader to get to the real gist of the advertisement. This vogue has recently begun to abate, and at the present time a great deal of thought and consideration is given to the proper typography, and better results are being secured every day. This gradual return toward the restraint of earlier times is really most desirable for the profession.

As to the matter of display the advertisement cannot be compared with reading-matter, because in the magazine, book, or other vehicle for straight reading-matter the readers seek out that portion which interests them. The advertisement must seek out for its readers that which is most desirable to bring before their notice and make it so attractive that they will read it.

In sketching, as few display-lines and groups as possible should be planned. This is necessary in order to make the advertisement simple and easily readable. Too many display-lines and groups merely destroy the reader's concentration. (See Figs. 48a and 48b.)

The advertisement should be of such a nature as to hold the reader's attention without much effort on his part. The reading of the advertisement must be made as agreeable and as pleasant as possible.

The Vital Points at a Glance.—The reader must find the vital points at a glance. It should not be necessary for him to look for the important elements. The chances are he will not exert himself to that extent. It is of the greatest importance that the vital points shall be brought out so that they will invite the reader to look over the reading-matter which is not displayed. For that purpose the display-lines must stand out and be inviting.

Questions

1. What is meant by the mating of type-faces?
2. What determines the need for display?
3. How are the vital points of advertisements noticed at a glance?

JOB NO. 10—DISPLAY-TYPES FOR VARIOUS PURPOSES

Light and Heavy Types.—Heavy job-types are good for posters, window-cards, etc.—which are to be read at a distance, but for magazine advertisements, lighter faces are preferable. Of course, the dark or light effect in type-matter is entirely relative. In a large advertisement, bold-face type may appear quite light in tone, while the same type may be very heavy in a smaller advertisement. In small advertisements, where 12-point or 14-point is the largest type used, it is sometimes necessary to use bold-face type for the display—otherwise it may be too weak to be effective.

Use of the Various Sizes of Type.—The matter of display is relative, and a series of different sizes of the same face will give the desired results. It is not necessary to employ

different faces of types for one advertisement. One face of type—simply using the different sizes—will often have better results, because that will be more harmonious than the use of several different type-faces.

Families of Types.—Many advertisements may require two different types—one face, the light tone, for the body, and the heavy tone, or bold-face, for the display. In cases where more than one face of type is used, it is advisable to use the types of the same family; and most type-faces are made in rather large families—such as, Caslon Oldstyle, Caslon Bold-face, Caslon Italic, etc.

The Lower-Case Type versus Capitals.—Lower-case letters, or minuscules, are generally preferable to capitals, because they are more legible. They should be used particularly where more than one line of reading-matter is needed for a grouping. Capitals are sometimes used to advantage in display-lines, but in most cases the combination of lower case with capital initials are preferred. Under these circumstances, the capital initial is used for all words except prepositions, articles, and conjunctions.

Capitals may be used to advantage in formal announcements, business-cards, certain other commercial stationery, and in display-lines where there is a great deal of white space. They may also be used in running-heads, where it is desirable to get an even square effect.

Where capitals are used for the body-matter in an advertisement, they make it hard for the reader and take away from the effectiveness of the advertisement.

Questions

1. What determines the use of light-face and bold-face types?
2. How are the various sizes of types to be used?
3. What determines the use of capitals and lower-case type?

JOB NO. 11—ORIGINAL DESIGNS, NO. 1

The time has now arrived for the student to take up some manuscript copy and draw up some original work of his own. Very simple results are expected at first, and the student is

cautioned to draw up several skeletons before making a finished drawing. As few display-lines as possible should be used, and the most important line or lines should be selected for that purpose.

The sizes of types to be used must be based on the size of advertisement, the amount of the white space to be used, and the allowance of space for illustrations, ornamentations, and borders.

Here the main lines are selected first, and the other lines are based on them. We must make an effort to properly display the relationship of lines and their comparative importance.

The border should never be stronger than the type-matter. If anything, it is to show merely a modest frame and is never to be so heavy as to divert attention from the type-matter.

The selection of the border is usually left to the judgment of the typographer, who should realize the true function of that type-element.

The following is the copy for a simple advertisement:

MARL FURNITURE

Sixty years the standard in homes where the best is required

Rarer charm of artistic design and master craftsmanship are to be found in our Furniture. The highest standard only is always the Marl characteristic. We are widely recognized experts in dependable period designs, and will gladly assist you in the selection of harmonious combinations for your country home and your town house.

Special Offer to Our Patrons and Future Patrons

During the month of September we shall make a feature of Colonial Dining Room Suites of ten pieces, charmingly designed and substantially made, and at the remarkably low price of $650.

These suites are now on display in our Broad Street show rooms, second floor. Your inspection is invited

---

Marl Furniture House

Broad and West Streets, Memphis, Ohio

Instructions for the Advertisement.—The size of the advertisement is 3 by 5 inches. Use a rule-border. Use no more

than two faces of type, allowing larger sizes for the display. Display as few lines as possible.

In drawing the design, draw the letters for all the display-lines and use plain lines for the reading-matter. See that the margins on top, bottom, and sides are even. It would be well also to indicate the kind and sizes of type to be used.

The outline below (Fig. 49a) has been constructed from the foregoing copy.

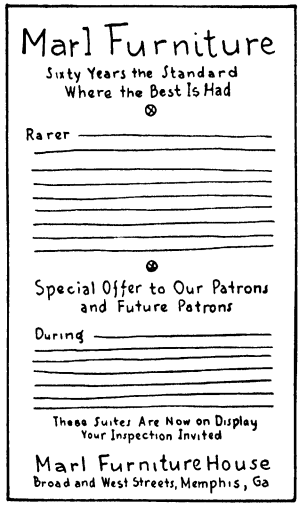


FIG. 49a.—Design for No. 1 Advertisement

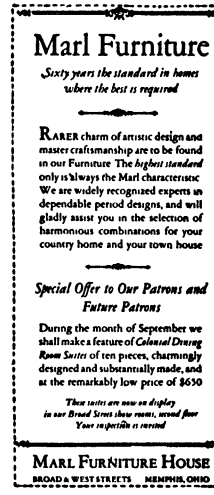


FIG. 49b.—The Result in Printed Form

In setting the advertisement, the compositor has departed somewhat from the plan of the layout—as, for instance, with regard to the ornaments, the three italic lines at the bottom, and the rules. This is permissible, so long as the general idea of the job is carried out.

Questions

1. What is the first step to take in preparing the layout for the advertisement?
2. How are the display-lines to be determined?
3. How is the body-matter to be drawn in?

JOB NO. 12—ORIGINAL DESIGNS, NO. 2

The selection of the style of type—light, medium, or bold, in accordance with the requirements of the subject-matter and the taste of the public it is to reach—is the primary thought. Next is the size of type for display-lines and reading-matter.

The most important line in an advertisement is usually the title of the subject-matter, and that line is usually set much larger than the other display-lines.

Frequently there are lines representing subsidiary headings, which are set in type comparatively smaller than the main line.

The name and address—which is usually at the foot of the advertisement is set in rather small type. This type should be a little bolder in face than the type of the body—usually the same style of type as the head—but is set in smaller type, as a rule, than that of the body.

The other display-lines are set in sizes in accordance with their importance, and should always be treated in comparison with the main lines of the advertisement.

For the second design we have the following copy:

Announcing a New Parisian Fabric

SATINETTE CLOTHS

These cloths are the rage in France, where they have become very stylish since their introduction some time ago. We extend a cordial invitation to everyone to call and inspect these superb goods.

New stock has been ordered and a complete line of dress fabrics will always be available. Our silks are from China and Japan, and are woven from patterns designed by our staff. We are agents for all the foreign textile manufacturers, who know our ability in handling their sales from our many years contract.

For the convenience of many of our out-of-town customers, a new department will be installed very shortly, which will take care of all orders that must be handled with quickness and dispatch. It will be in charge of a competent manager, who will always be ready to assist and advise in filling of orders.

Garbardines, Taffetas, Homespuns

John Mendern Company

619-623 Drumerond Avenue, Baltimore, Md.

Telephone, Murray 837.

Instructions for Advertisement.—The size of the advertisement is to be 5 by 7 inches. A simple rule-border is to surround it. Use two faces of type, with different sizes for display-lines. Make double column for body-matter, so that it will be easier for the reader.

The display-lines should be carefully drawn in, and lines are to be used for the reading-matter. Care must be taken in allowing sufficient and even margin around the advertisement and proper spacing between the lines and groups.

The layout below is suggested for the foregoing copy of advertisement:

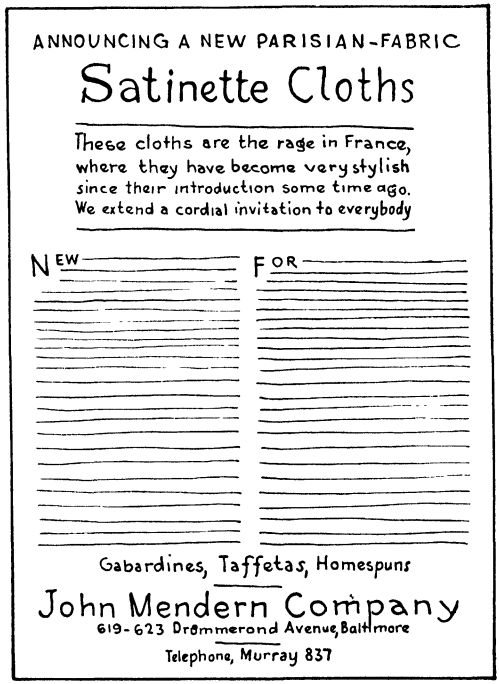


FIG. 50a.—Design for No. 2 Advertisement

In setting the advertisement, the compositor has followed the general idea of the outline (as shown in Fig. 50a), without adopting every detail. This is permissible.

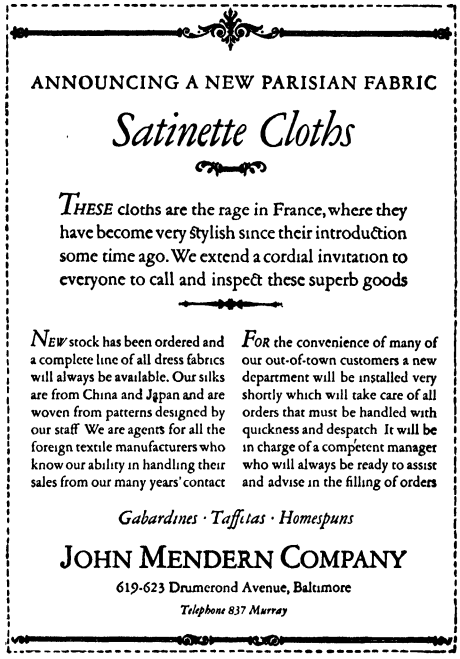


FIG. 50b.—Result in Printed Form

Questions

1. Which is the most important line in this advertisement?
2. What is the reason for dividing the body-matter into double column?
3. How should the name and address at the bottom be displayed?

UNIT IV

PRINTERS' ENGLISH

PROOFREADING

JOB NO. 1—PROOFREADERS' MARKS

JOB NO. 2—PROOFREADERS' MARKS (*Continued*)

JOB NO. 3—GALLEY-PROOF

JOB NO. 4—PROPER MARKING OF PROOFS

JOB NO. 5—PAGE-PROOFS, ETC.

JOB NO. 6—PROCEDURE IN THE PROOFROOM

JOB NO. 7—PROCEDURE IN THE PROOFROOM (*Continued*)

PUNCTUATION

JOB NO. 8—THE COMMA

JOB NO. 9—THE COMMA (*Continued*)

JOB NO. 10—THE COMMA (*Continued*)

JOB NO. 11—THE COMMA (*Continued*)

JOB NO. 12—THE SEMICOLON

JOB NO. 13—THE SEMICOLON (*Continued*)

JOB NO. 14—THE COLON

JOB NO. 15—THE PERIOD

JOB NO. 16—THE INTERROGATION-POINT

JOB NO. 17—THE EXCLAMATION-POINT

UNIT IV

PRINTERS' ENGLISH

Proofreading

In the Study of Printers' English is included proofreading. Here the first lesson deals with proofreaders' marks—which are a necessary acquisition for everyone taking up the printing trade.

JOB NO. 1—PROOFREADERS' MARKS

Proofreaders' marks, like punctuation marks, have been adopted for the sake of expediency. These marks have been found to be most economical in so far as they tend to avoid the writing out of minute and elaborate instructions, and, consequently, save time and space.

In all cases, it is to be noted, the marks should be made in the margin. The marks used within the text are the caret (∧), inverted caret (∨), underscoring line (___), slanting stroke (/), circle (○), the close-up marks (‿), and the transposition mark (~), all of which should be used in connection with the other marks to indicate where corrections are to be made.

The following marks will illustrate the modern ideas in marking proofs for correction:

∧ *Caret.* To indicate where letter, word, or space is to be inserted. This mark is used within the text, and never in the margin, and is to be used only for the purpose of indicating an insertion.

Insert space where caret is made. This mark is to be used only in the margin.



Less space. This marginal mark indicates that the spacing between words is to be reduced. The mark within the text showing where spacing is to be reduced is the inverted caret (ˇ) and is to be used as a superior mark above the reading matter.



Equalize spacing. Made in the margin to signify that uneven spacing of the words should be corrected. The spaces in the lines are marked at the bottom with caret (for more space), and at top with an inverted caret (for less space).



Push down space. To be used to indicate the correcting of spaces or quads which sometimes work up in type-matter. The mark within the text to indicate the place of correction is a stroke, thus (/), over the visible space.



Broken or defective letter. Besides the mark in the margin, a line under or through the defective letter or word is used within the text (b̲) to show where the correction is to be made.



Wrong font. Where one or more letters of a different kind of type have found their way into the matter, this mark is used in the margin to call attention to the marked letters within.



Take out letter, letters, or words indicated. This is called the dele-mark, originating from the Latin word *delete* (take out).



Take out and close up. Where one or more letters are to be removed within a word, the close-up marks are necessary in order that the word may not be erroneously split in two. It is also customary to use the close-up marks within the text, on top and below the matter to be removed.



Turn inverted letter. Here again the letter to be turned is underscored within the margin.



Let it stand. Where matter which has been scratched by mistake is to be retained, the matter within the text is dotted underneath, and the word *stet* placed in the margin. The word *stet* is from the Latin.



Insert period. The circle is drawn around the point in order that the period may be easily noticed. The caret is used in the text at the place of insertion.



Insert apostrophe. It is necessary to use the inverted caret with the mark in the margin, so that the mark may not be mistaken for a comma. Within the text, the caret is used at the place of insertion.



Insert comma. The caret over the comma is not absolutely necessary, but it serves as an additional safeguard against misunderstanding.



Insert star. Used for notes of reference. The inverted caret is useful here, as it is in all cases of superior marks or figures.



Take out lead between lines.



Insert superior figure one (1). The inverted caret distinguishes it from the regular and also from the inferior figure.



Insert inferior figure one ($_1$). Used in chemical formulas. The caret determines the character of the figure.



Insert one-em quad. To be used in marking indentions for paragraphs and also for space between sentences. A double square is marked in the margin where a 2-em quad is wanted.



Insert 1-*em dash.* Where a 2-em dash is desired, the figure *two* (2) over the line is substituted for the one (1).



Insert hyphen. A double stroke is used to make the character more easily recognizable.



Close up or draw together matter. These marks are used where space has been left inadvertently where none should be. The same marks are usually made over and below the matter to be corrected within the text.



Transpose letters or words indicated. A stroke is used under the letter or words to be transposed. Some proofreaders prefer the transposition-mark within the text instead of the underscoring line. (Proofreader; Proofreader.)

Questions

1. Which are the marks used within the text?
2. What is a wrong font?
3. What is the origin of the dele-mark?

JOB NO. 2—PROOFREADERS' MARKS (*Continued*)



Bring matter to the left. When it is desirable to bring matter over more to the left, the matter in the text must be similarly indicated.



Bring matter to the right. It will be noticed that the horizontal line is the deciding factor in showing whether matter is to be moved to the right or left.



Lower word or line. This mark is occasionally used in display-work where it is desired to rearrange the position of a line.



Raise word or line. Like the above, this mark is also usually employed for display-work.



Line up letters out of alignment. When letters fall below or are raised above the line, the corresponding parallel lines are used both within the text as well as in the margin.



Justify lines; make them even. This usually occurs at the beginning or at the end of lines in page-proofs.



Denotes paragraph. This mark is used when matter to begin new paragraph is run in with preceding paragraph. The caret is used at the beginning of the sentence where paragraph is to start, with the paragraph-mark on line in the margin.



No paragraph. When matter beginning a new paragraph is to be a part of preceding paragraph, either one of these marks may be used.



Indicates logotype characters. The half-circle on top will show the corrector that logotype characters are to be used where indicated within the text.



Indicates diphthong. Here also the half-circle is used to show that the two letters are to be on one body.



Set in bold-face or full-face type. When a heavier letter is desired, the matter so to be set is underscored and indicated in the margin by either one of these two marks.

Set in small capitals. Matter to be reset is indicated by underscoring.



Set in capitals.



Set in italics.



Set in roman type (meaning plain type, as distinguished from italics).



Set in lower-case type (meaning small letters).



Spell out. When figures or abbreviations in the text are encircled (&) (3), it indicates that they should be spelled out. The word "spell" is usually written in the margin.

Indicating that matter has been left out from copy. When a line or more has been omitted from copy, it is not advisable to write it all in the margin. This simple method calls the corrector's attention to the copy, where he gets the matter first-hand, and saves the time of the proofreader.

Questions

1. What is the difference between superior and inferior characters?
2. In making the proof, how is the hyphen distinguished from the dash?
3. What are logotype characters?

JOB NO. 3—GALLEY-PROOF

The first work in actual proofreading is done on a galley-proof. The student should read the proof carefully, find the mistakes, and mark them with proper proofreaders' marks in proper margins, as is indicated below. (See Fig. 51.):

The PROOFREADER

IT does not follow that the average type-setter is or can be a good reader. His knowlege of names and technicalities is half enough. If he has not earned an experts reputation for clean composition, as has been proved by his ability to decipher imperfect manuscript and to point and Capitalize with propriety; if he does not display a genuine fondness for books by the knowledge that comes from some study as well as from omnivorous reading; if he has no more than a passible acquaintance with authors and books and men of history and fiction; if he has not the literary instinct which leads him to value books for their mechanical merit — he cannot be a correct reader of books. It is a great risk to trust him with the simplest reading. The reader good in one house may be inefficient in another, for the requirements of printing-houses vary. On the ordinary daily newspaper the knowledge broad required of the reader is the knowledge of today, which comes from present observation more than from study of books. A good memory is also

FIG. 51.—Galley-Proof

Questions

1. What is the reason for the reading of proof?
2. What kind of mistakes will the proofreader look for?
3. What is the distinction between typographical and grammatical errors?

JOB NO. 4—PROPER MARKING OF PROOFS

Neatness and clearness in marking proofs are almost as important as finding the errors, for of what use would any marks be if they did not convey an intelligent idea to the compositor who corrects the proof? It is important to bear in mind that the corrector must understand at a glance the corrections to be made. He has not the time to study unintelligible marks. It is then essential, first of all, to mark a correction in the margin as near as possible to the word in the line to be corrected and on a line with it.

If there are several corrections in the same line, the marks in the margin must be placed in the order in which the corrections are to be made and they should be separated by a stroke in each case. The stroke may also be used to advantage with single corrections—particularly when the marks are small and not easily noticed. The stroke should always be to the right of the mark, whether the latter appears on the right or left margin of the proof. In all cases, the marks should appear in their proper order Another use for the stroke is in the case where a mark is to be repeated for correction within the same line two or more times. (See Fig. 52.)

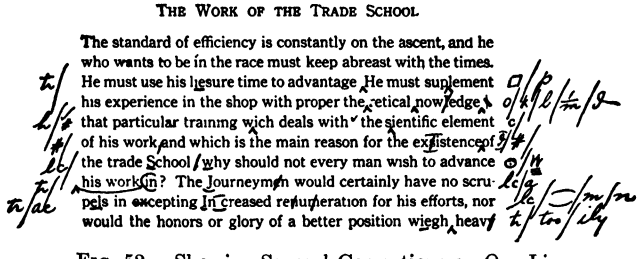


FIG. 52.—Showing Several Corrections on One Line

Questions

1. Why should a proof be marked clearly and plainly?
2. What is the use of the slanting stroke?
3. When is the stroke to be repeated for the same mark?

JOB NO. 5—PAGE-PROOFS, ETC.

When the student has become proficient with the galley-proof, the page-proof (see Fig. 53) is taken up. After that follows final reading—such as, the stone-proof, the press-proof, and the foundry-proof.

12 THE MOUNT HOPE SCHOOL JOURNAL

MOLES AND MONKEYS

Have you ever noticed a gull dropping on to the sea—how it spreads its wings high so that the feathers shall not be wetted? If a gull's wing feathers get wet, it cannot rise until they dry.

Throw a mouse into the water, says *Tid-Bits* (London), and it can swim a little, but as soon as its fur is soaked, down it goes. So too in the case of a rabbit. As soon as its fur is wet, it is done for.

A mole can swim like anything, but a monkey is helpless in the water. Almost all land birds drown very quickly if unlucky enough to fall into the water. They strike out with their legs, move round and round in a circle, but cannot get off the water.

Lions and tigers are good swimmers and do not share the common cat's hatred for water. But of all the cat tribe, the South American jaguar is the finest water performer. It seems often to plunge in for mere joy.

Although a rabbit drowns, its near relative, the hare, swims well, and often will cross a river when hunted.

Bears are good swimmers, even those that usually live far from large sheets of water, and the common rat is no poor performer. One of the best animal swimmers is the horse. Horses have been known to swim a river almost a mile wide simply to get back to their old stables.

Deer, too, can swim well. There are cases of caribou having swum across lakes ten miles wide when escaping from forest fires.

THE PORTS OF FINLAND

Conversation in Abo, one may readily believe by report from Finland, is finding daily food in the superior claims of that town over the town of Hango to become the important winter harbor of Finland, and conversation in Hango is equally busy with the superior claims of Hango over Abo. Abo, Hango, and Helsingfors are Finland's three ice-free winter ports, which means that ice-breakers are necessary to keep them open, and the statistics of the past are said to prove that the trade of the future will provide both Abo and Hango with all the shipping they can handle. But both harbors need improvement, and each town evidently feels that its own harbor should be attended to first. The larger seagoing steamships, for example, cannot now enter Abo, and the townfolk naturally feel that the project for making their port a first-class harbor should be put through as soon as possible, but the townfolk of Hango are arguing that the many islands sur-

FIG. 53.—Page-Proof

The reading of advertisements, commercial work, and other forms of display work will come after students have become familiar with book work and other proofreading with straight matter. This, however, cannot be taken up during the first year. It is necessary for the student to continue his work during the following year in order to learn display-proof reading.

Questions

1. Why are there fewer mistakes to be found in the page-proof than in the galley-proof?
2. Why are too many hyphens in consecutive order, on the ends of lines, not permissible?
3. What mistakes may be found on the page-proof which are not in the galley-proof?

JOB NO. 6—PROCEDURE IN THE PROOFROOM

The copy of a book, magazine, or other large job coming into the composing-room is set up and first placed on galleys, of which proofs are pulled and sent into the proofroom.

Galley-Proofs.—The galley-slips are, therefore—except in the case of the smaller jobs, stationery, blanks, and reprints —the first proofs to be read by the proofreader.

On the better class of work the proof is sometimes first looked over for typographical errors, and it then gets a second reading by copy. In the book-and-job offices, the copyholder reads aloud to the proofreader from the copy, and the aim is to have both copy and proof agree as nearly as possible. A different custom prevails in the newspaper office, where the proofreader usually reads to the copyholder.

When the galley-proof is read and the marks properly made in the margin, it is returned to the composing-room to be corrected. A corrected proof of the matter is then sent in to the proofroom, and this is compared by the proofreader with the first proof. When the galley-proof is clean, it is then prepared to go to the author or customer with other proofs. One colored proof and two or more white proofs are usually sent out. The colored proof is used by the author for the pasting of the "dummy," and the author's corrections are marked on one of the white proofs.

The author returns the white proof with his corrections and the pasted-up "dummy" (for the guidance of the printer in making up the pages).

Page-Proofs.—In the composing-room the galley-matter is then corrected according to the author's marks and arranged in page-form. Page-proofs are pulled and sent into the proofroom to be revised. The proofreader first revises the author's corrections and then looks over the make-up.

In revising pages by galley-proofs it becomes necessary to see that the lines have not been transposed or omitted during the make-up. A good method is to have the copyholder read the first word of every line on the galley-proof to the proofreader, who compares the matter with the page-proofs. Another method, not as accurate nor as satisfactory, is to place the galley-proof alongside the page-proof and measure the lines of one proof by the other. This latter method is not safe, since it is not as easy to catch the transposed lines, and is only adopted in shops where the work is very ordinary and requires no great amount of accuracy.

Besides this verification, the proofreader reads over every heading, subheading, and caption, and verifies the running heads and folios, compares the illustrations, if any, with the dummy or copy, verifies the list of contents, if the page-proofs are complete, and reviews generally to see that all instructions and rules of local style and general style are followed.

If any errors are found on the page-proofs, the proofs are returned to the composing-room to be corrected. Proofs of the corrected pages are pulled and sent into the proofroom to be revised. Then, when the pages are all clear of errors, they are again sent to the author. Usually two or three sets are sent out, one of which is again pasted up by the author for a dummy and returned with or without corrections, as the case may be, and generally with his mark of approval.

This second dummy then finds its way into the composing-room, corrections are made, and the pages are locked up either for foundry or for press, according to whether the work is to be printed from plates or type.

When the pages are to be printed from plates, foundry-proofs are pulled, which are sent into the proofroom, again to be read. This is called final reading. Greater care is usually taken in foundry reading than other work, since the making of plates signifies, first, a large run, and, secondly, a use of the plates for future runs. Besides, it is not as easy to correct plates as type-matter.

Stone-Proofs and Press-Proofs.—The next process is the reviewing of the stone-proofs. When the pages are to be printed from type, they are locked up for the press after the pages have been corrected by the author's proofs. In that case it is usual to take the stone-proofs for the final reading. The stone-proofs are revised by the author's proofs, read, and reviewed, and sent back to the composing-room.

If the pages are to be printed from plates, it is not necessary to do any final reading on the stone-proofs, since that had previously been done on the foundry-proofs. But it is necessary to look them over carefully, as there is always a possibility that a form may become battered in handling, or that the foundry-men may mold over letters or words, or mortise some live matter, or leave out matter which should have been mortised. It also happens sometimes that cuts within the text are transposed or turned upside down after the foundry-proof has been passed in the proofroom. It is well, under such circumstances, to look carefully down the lines of each page, to scan particularly matter near an open space, and watch for defective type and rule.

When a stone-proof is sent back to the composing-room, it is corrected; after which the form is sent to press. The next proof is a press-proof. The press-proof is revised by the stone-proof and again generally reviewed. If everything is in good condition, the proofreader places his "OK" with his signature in the top margin of the sheet, and sends it to the pressroom. When there are still some corrections to be made on the press-proof, another proof is required for an "OK." In rare instances, particularly when work is to be rushed through, a press-proof may be "OK'd with corrections," when there are only a few to be made.

It is always well to look over the press-proof carefully in every particular. The pressman sometimes finds it necessary to lift out the cuts for underlaying. In so doing he is liable to to put back a cut upside down or transpose it with a similar cut. He is liable, in replacing the cut, to "pi" the caption. There is also a possibility, while brushing the form, that some thin letters may break at the ends. When the press-proofs of every form of the job are approved, the duty of the proofreader is done.

Questions

1. Which is the first proof sent to the proofroom?
2. What is the consecutive order of proofs sent to the proofroom?
3. How should a press-proof be treated in the proofroom?

JOB NO. 7—PROCEDURE IN THE PROOFROOM (*Continued*)

Revising.—It is well to bear in mind, when revising from author's proofs, that compositors, like other human beings, have their faults, and it is through an understanding of these that the proofreader can best take care of his own work. The proofreader, in revising, sometimes finds that a correction has not been made. His first impulse is to mark the correction again and let it go at that. The experienced proofreader will realize, however, that the correction may have been made on another line which is similar, and he will glance up and down the page before marking again.

In the case of linotype slugs, the compositor may have thrown away a good line and substituted a corrected line belonging to some other place, leaving the faulty line in place.

When, therefore, the proofreader finds that such an error has been made in linotype matter, he will naturally mark the corrected line to be transposed where it belongs and write in the other line which has been misplaced.

In case the wrong correction has been made in monotype or hand-type, it would become necessary to mark the original correction again and mark the erroneously corrected line back to its original form.

Errors made in corrections are often the hardest to catch; and unless the proofreader is very careful, they will occasion,

as in the first case mentioned, a serious situation. Books often have to be reprinted on account of the senseless reading resulting from linotype slugs being misplaced in correcting and being overlooked by the proofreader.

Reading Advertisements.—Much more care is always required in the reading of advertisements than in almost any other work. A mistake is regrettable anywhere, but much more so in an advertisement, for which the advertiser usually pays by the line. It is customary to refund the money for an advertisement in which a mistake occurs; and a good many advertisers are quick to take advantage of it. Agencies which give out a good deal of advertising employ proofreaders whose special duty it is to catch flaws in printed advertisements; and a large amount of money is realized by these agencies during the year through deductions in publishers' bills on account of errors in printing.

Commercial Work.—In commercial work, also, the reading required is more accurate than in trade-journal, magazine, book, or newspaper work.

Since a publication serves not only as a chronicle of events, but also supplies fiction, or other ephemeral reading, the requirements for accuracy are not as exacting as in the case of a billhead, letterhead, business-card, or other items of stationery which are used every day and which are ordered and paid for by the individual customer.

In reading tabular work it is a good habit to read each column from top to bottom, as well as across the page.

Newspaper Work.—In the case of editorials and advertisements on a newspaper, much greater accuracy is required than for ordinary news-matter, and the proofs are usually gone over two or three times before insertion.

News-matter is usually railroaded through—one reading only being customarily given to this kind of matter.

Questions

1. How is a proof revised?
2. How should tabular work be proofread?
3. How is the news-matter on a newspaper treated in the proofroom?

PUNCTUATION

In the study of punctuation—another division of the study of English—the student learns something which is an everyday necessity for the printer. The compositor and machine-operator must understand punctuation in order to do successful work.

JOB NO. 8—THE COMMA

The proper use of the comma is not to show where rhetorical pauses are made, but to convey to the reader the exact meaning of the text at first sight. Its purpose is to point out the grammatical subdivisions and intercalations of the sentence.

1. *When a conjunction is omitted between connecting words, phrases, or clauses, the comma is to be substituted for it.*

Their search extends along, around the path.
We are fearfully, wonderfully made.
It was a cold, dreary afternoon.

If the comma were not used in this case, it would appear as if the two modifiers were not independent of each other and as if one were modifying the other.

It was a cold dreary afternoon.

2. *A comma should be used to indicate the omission of the verb or verbal phrase, or noun or nominal phrase, in a compound sentence.*

From law arises security; from security, inquiry; from inquiry, knowledge.

A wise man seeks to shine in himself; a fool, in others.

Our taste will be discovered by that which we give; our judgment, by that which we withhold.

In the pursuit of intellectual pleasure lies every virtue; of sensual, every vice.

The omission of the comma here would involve the sentence so that no implied word or words would be understood.

In the pursuit of intellectual pleasure lies every virtue; of sensual every vice.

3. *Insert the comma after a word or group of words independently beginning a sentence.*

Unfortunately, there is widespread belief that it is better to use too many than too few commas.

In spite of all our efforts, we could not restrain the combatants.

Referring to your note of the 10th inst., I would say that your proposition is agreeable.

To the good, old age is the time of content.

The insertion of the comma helps to show the gist of the sentence. It separates any supplemental matter from the principal construction. Without the comma, the statement will often not be clear.

To the good old age is the time of content.

Questions

1. What is the use of the comma in modern literature?
2. What are some of the rules for the use of the comma?
3. Why should a comma be used between two modifiers of a noun?

JOB NO. 9—THE COMMA (*Continued*)

4. *When a sentence is broken to receive an incidental or parenthetical expression, a comma is placed before and after the inserted word or group of words.*

It would be well, therefore, to emphasize that point.

Paul, the apostle of the Gentiles, was martyred.

I am, my dear sir, your obedient servant.

The actor, having temporarily created the character assumed by him, was generously applauded.

The prisoner, said the witness, was a convicted thief.

The separation of the parenthetical expression leaves the gist of the sentence intact and makes it easier for the reader to comprehend the meaning of the statement. Some sentences would become so involved if the parenthetical enclosure were not set off that they would be difficult to grasp.

The prisoner said the witness was a convicted thief.

5. *A relative clause which is explanatory of its antecedent must be set off by a comma.*

Cherish true patriotism, which has its root in benevolence.

They passed the cup to the stranger, who drank heartily.

It frequently happens that the printer returns the manuscript to the author, who causes the copy to be rewritten.

A clause of this kind forms a separate statement, and should, therefore, be set off from the preceding statement in order to show plainly its independence. The omission of the comma would make the relative clause seem to be a modifying phrase, as in the following rule.

They passed the cup to the stranger who drank heartily.

6. *A relative phrase or clause limiting or restricting its antecedent should not be preceded by a comma.*

Everyone must love a boy who is attentive and docile.

He preaches sublimely who lives a sober and holy life.

There is no charm in the female sex supplying the place of virtue.

The insertion of a comma before the limiting phrase would make that phrase appear like a separate statement—not as a modifier of the preceding expression.

Everyone must love a boy, who is attentive and docile.

Questions

1. What is a parenthetical expression?
2. Why should commas be used on each side of a parenthetical expression?
3. What is the difference between a relative clause and a limiting clause?

JOB NO. 10—THE COMMA (*Continued*)

7. *Clauses of a compound or complex sentence are to be separated by a comma when the subject changes or when they are antithetical and the connection of the clauses is too close for a semicolon.*

Earthquakes have lately been observed southward, and we may therefore expect more severe cold in the North.

Printers may try to make a sentence clear by punctuation, but they cannot so clarify one that is badly worded.

Every English grammar has a chapter on the subject of punctuation, and there are many books of authority that treat of punctuation exclusively.

The comma separating the two statements plainly shows that they are not coordinate. The omission of the comma may lead to a wrong interpretation—particularly, where a conjunction is used.

Printers may try to make a sentence clear by punctuation but they cannot so clarify one that is badly worded.

8. *A comma is to be inserted after each but the last of a series of words or phrases each of which has the same connection with what precedes or follows.*

Ulysses was wise, eloquent, cautious, and intrepid.

Plain, well-punctuated, and otherwise carefully prepared manuscript is desirable.

Among them are the Central Union, Copper Falls, and Calumet and Hecla mines.

Blue, gray and white, and black and white goods were sold.

The comma shows that each adjective or noun—as the case may be—is entirely independent. Its omission before the conjunction, which often happens with careless writers, may upset the writer's intended meaning, or may give no clear idea as to his meaning.

Among them are the Central Union, Copper Falls and Calumet and Hecla mines.

9. *Where a sentence is so constructed that the subject ends with a verb and the predicate also begins with a verb, a comma should be used between subject and predicate.*

Whatever is, is right.

All things that are, are with more spirit chased than enjoyed.

What is foreordained to be, will be.

The necessity for the exception to the general rule of using no comma between subject and predicate in this case is quite obvious. The omission of the comma here might lead to confusion.

All things that are are with more spirit chased than enjoyed.

Questions

1. What is the difference between a compound and a complex sentence?
2. When is it proper to use a comma before a conjunction?
3. When is it proper to use a comma between a subject and a predicate?

JOB NO. 11—THE COMMA (*Continued*)

10. *Where two or more similar adjectives are used to qualify the same noun, commas are needed to separate them.*

He was a brave, honest, and good man.
He then proceeded to draw out a pair of old, shabby, and very dirty kid gloves.

All the adjectives here are similar and independently modify the noun. The comma takes the place of the implied conjunction "and." If the commas were not used in this case, it would appear as if one adjective were modifying the other.

He was a brave honest and good man.

11. *Where, of two or more adjectives in a series, one is qualified by the one or more preceding, the comma is to be omitted before it.*

He was a very good old man.
She had fine dark-blue eyes and beautiful light-brown hair.

The comma is omitted here to show that all the modifiers of the noun belong together and do not separately modify it. There is no conjunction understood or implied here. The use of the comma would change the sense. It would sound as if he were good and old.

He was a very good, old man.

12. *A salutation incorporated in the body of the sentence should be set off by a comma.*

Mr. President, my object is peace.
Friends, hear me for my cause.
It is to you, good people, that I speak.

The reason for the comma here is to set off the independent phrase from the body of the sentence. If the comma were not used, it would make the sentence less clear and make the salutation seem like the subject.

Friends hear me for my cause.

13. *A quotation, maxim, or similar expression, when it is a part of the grammatical construction of the whole sentence, should be set off by a comma from the introductory statement.*

The old proverb, "Too much freedery breeds despise," is now rendered, "Familiarity breeds contempt."

It hurts man's pride to say, "I do not know."

God said, "Let there be light."

The quotation in this sense is used as part of the sentence. Therefore, the use of the colon would be wrong, as it would make the quotation independent of the rest of the sentence.

It hurts man's pride to say: "I do not know."

14. *The comma is used as a substitute for missing words in specifying addresses of persons and in giving dates.*

Hon. Geo. F. Hoar, Washington, D. C.

He lives at Hudson, Columbia County, New York.

This event took place in October, 1874.

15. *The comma is used to divide numbers into groups of three figures denoting thousands, millions, etc.*

The distance of the earth from the sun is usually stated at 95,000,000 miles.

The house was sold for $26,000.

The weight of that stone was 6,000 pounds.

The comma is here used for convenience to the reader, as the figures are much more easily read when separated.

Questions

1. Why should the comma be used between similar adjectives and not between dissimilar ones?
2. When is the comma, rather than the colon, to separate a quotation from the rest of the sentence?
3. Why should the comma be used for dividing groups of figures?

JOB NO. 12—THE SEMICOLON

The main function of the semicolon is to distinguish between the principal and the minor clauses and phrases of a sentence. It helps to show the reader at a glance the relation of the various members of the sentence to one another, and thereby makes the context clear and comprehensive.

1. *A semicolon should be used between clauses where the break in sense is too distinct for the use of a comma and not sufficiently distinct for that of a period.*

Let there be no strife between theology and science; there need be none.

Wisdom hath builded her house; she hath hewn out her seven pillars; she hath killed her beasts; she hath mingled her wine; she hath furnished her table.

There is good for the good; there is virtue for the faithful; there is victory for the valient; there is spirituality for the spiritual.

The semicolon is needed to show a lesser relationship between statements than would be the case where commas were used. If commas were used where the relationship is not sufficiently close, the sense would often be obscured.

Let there be no strife between theology and science, there need be none.

2. *Clauses of a compound or complex sentence should be separated by a semicolon if those clauses, or any of them, are subdivided by commas.*

He was courteous, not cringing, to superiors; affable, not familiar, to equals; kind, but not condescending or supercilious, to inferiors.

Books are the food of youth, the delight of old age; the ornament of prosperity, the refuge and comfort of adversity; a delight at home and no hindrance abroad; companions by night, in traveling, in the country.

Some place their bliss in action, some in ease; those call it pleasure, and contentment these.

The semicolon in a compound or complex sentence will separate the principal statements, which are not closely related; while the commas will separate the lesser statements, which are more closely related with each other.

If there were no distinction made in the use of semicolons and commas, the reader could not, at first glance, get a sufficiently clear idea of the meaning of the sentence.

He was courteous, not cringing, to superiors, affable, not familiar, to equals, kind, but not condescending, to inferiors.

Questions

1. How is the semicolon distinguished in its use from the comma?
2. How is the break in sense that would require a semicolon determined?
3. What are principal and what are lesser statements?

JOB NO. 13—THE SEMICOLON *(Continued)*

3. *A semicolon should be placed after a clause followed oy one or more connective clauses introducing contrast, inference, or explanation.*

A wise minister would rather preserve peace than gain a victory; because he knows that even the most successful war leaves nations generally more poor, always more profligate, than it found them.

It is in vain to gather virtues without humility; for the spirit of God delighteth to dwell in the heart of the humble.

Writers should know how to punctuate, and should do it carefully; for they alone can always be sure that the sense is not perverted by wrong pointing.

The comma in this case would not be strong enough to divide two statements introducing contrast or inference. The comma usually separates statements which are of equal importance, and this is what the reader would be led to infer in the case where the comma is used.

Writers should know how to punctuate, and should do it carefully, for they alone can always be sure that the sense is not perverted by wrong pointing.

4. *The semicolon is used between expressions in a series which have a common dependence on, or relation with, other words or expressions at the beginning or end of the sentence.*

Art has soothed my afflictions; it has refined my enjoyments; it has endeared solitude; and it has given me the habit of wishing to discover the good and the beautiful.

I have neither the scholar's melancholy, which is emulative; nor the musician's, which is fantastical; nor the courtier's, which is proud; nor the lawyer's, which is politic; but a melancholy of my own, compounded of many elements.

To present a general view of the whole Vedic literature; to define its extent; to divide it into well-distinguished classes of writings; to portray the circumstances of their origin; and to explain the method of their preservation and transmission to us—were some of the objects which Müller had in view.

5. *The semicolon should be used before "as," "namely," "e.g.," "i.e.," viz.," "for instance," and similar expressions, where examples or a specification for particulars follow.*

An adjective is a word used to limit or qualify the application of a noun or a nominal phrase; as, good, sweet, bad, fine.

Greece has given us three great historians; namely, Herodotus, Xenophon, and Thucydides.

The names of religious sects should always begin with a capital; e.g., Christian, Mohammedan, Catholic, Protestant, Methodist, Episcopalian.

These terms introduce a new statement illustrative of the preceding. The comma would not be strong enough in a case of this kind. It would not show any distinction in relationship from the case where the comma is used following the term.

An adjective is a word used to limit or qualify the application of a noun or a nominal phrase, as, good, bad, fine, sweet.

Questions

1. What is meant by "inference"?
2. How can we tell that certain expressions have a common dependence or relation with other words or expressions?
3. How are the terms "viz." and "e.g." used?

JOB NO. 14—THE COLON

The colon is used for the purpose of separating an introductory statement from the matter that is the logical sequence of that statement. It has the virtue of uniting the members of the nominative with those of the objective, and it makes the relationship clear between the governing expressions and those that are governed.

The dash should never be used together with the colon.

The distinction in use between the colon and the dash is that the colon will introduce one or more new sentences, or one or more new paragraphs; while the dash may only introduce a part of a sentence.

The colon should never be used within a sentence.

1. *A colon should be used after a word, phrase, or clause introductory to a speech.*

The Honorable James A. Garfield was then introduced, and spoke as follows:

Lord Chatham, in his speech on the Right of Taxation, says:

Mr. Smith then delivered the following speech:

Mr. Chairman, Ladies and Gentlemen:

Since the colon is used to introduce one or more sentences, it would not be proper to use the dash or comma in this case, which could only introduce a part of a sentence

Mr. Chairman, Ladies and Gentlemen—

It has come to my notice that the electorate have erred in their most solemn of tasks.

2. *The colon is commonly used whenever an example or a formal quotation is introduced, which is independent of the grammatical construction of the introductory clause.*

Nothing can be more sophistical than this aphorism from Pope: "Whatever is, is right."

The Scriptures give us an amiable representation of the Deity in these words: "God is Love."

All our conduct toward men should be influenced by this important precept: "All things whatsoever ye would that men should do to you, do ye even so unto them."

When the quotation is a part of the grammatical construction, which is the case when the quotation represents the object, a comma would be sufficient to set it off; but when it is independent of the construction, it should be so shown by the proper punctuation, which in that case would be the colon. In the latter instance, the quotation is usually explanatory of the object.

If the comma were used in this case, it would not properly represent the sentence.

Nothing can be more sophistical than this aphorism from Pope, "Whatever is, is right."

3. *It is customary to put a colon after the complimentary salutation in a letter.*

Dear Sir:

Gentlemen:

To the Hon. Edward Jones, Governor of the Philippine Islands:

In this case the colon is necessary, because the salutation introduces matter which is, at least, the length of a paragraph. The comma or dash would not sufficiently emphasize.

Dear Sir— Gentlemen,

4. *The introduction to a statement of particulars or any other enumeration should have a colon at the end.*

The points to be considered are: (*a*) The nature of the measure. (*b*) The benefit it will confer upon the community. (*c*) The interests it may injure.

These books are for sale at the following places:

D. Appleton & Co., New York.
Curtis Publishing Co., Philadelphia.
Henry Hustis & Co., Los Angeles.

The following officers were elected: John Brown, president; Adam Smith, vice-president; Thomas Jones, secretary; Charles Green, treasurer.

The colon is the only introductory point strong enough to keep independent the various items introduced, since the statement followed by a colon may govern sentences as well as paragraphs.

If the comma or dash were used in the example below, the first semicolon would have the ability to separate all the preceding matter from the rest, and the expression intended to govern the various phrases would be limited to the first phrase.

The following officers were elected, John Brown, president; Adam Smith, vice-president; Thomas Jones, secretary; Charles Green, treasurer.

The colon should not follow a statement which is not clearly introductory.

The program of the plan is comprehensive and interesting. The details follow.

5. *The colon may also be used to separate hours from minutes.*

7:30 p. m. 9:25 a. m. 10:10 p. m. 4:15 a. m.

The colon is here used as a distinction from the decimal point. The decimal point, sometimes used in this case, is erroneous. The decimal point separates the whole numbers from the parts divided into hundredths; while the colon divides the whole numbers from the parts divided into sixtieths.

The use of the period in this case would be misleading.

10.10 a. m. 7.30 p. m.

Questions

1. What is the difference in use between the colon and the dash?
2. What is the real function of the colon?
3. Why is the colon preferable to the period in separating hours and minutes?

JOB NO. 15—THE PERIOD

The period indicates completion of the ordinary sentence. It is not good practice to use it at the end of an expression, as is often done, if the following statement begins with a copulative conjunction.

1. *The period should be used at the end of a declarative or imperative sentence.*

The sun warms the earth.
The reading of good books should begin in childhood.
Do not delay one moment.

The period is sometimes erroneously replaced by the exclamation-point at the end of an imperative statement. A distinction should be made between the imperative and exclamatory statements. The imperative statement, although more emphatic than the declarative, is not always exclamatory, and the use of the exclamation-point would produce a wrong interpretation.

Do not delay! Close the door!

2. *An indirect question takes the period at the end.*

The Cyprians asked me why I wept.
He then asked whether I intended to comply with his request.
He asked me what I would do in that case.

The indirect question is always in the form of a simple statement, and must, therefore, be limited to the period at the end. The interrogation-point, which is sometimes erroneously used, would create a false impression.

He asked me what I would do in that case?

3. *A period is employed to designate the abbreviation or contraction of a word.*

Jan. (January)	Dept. (Department)
Tues. (Tuesday)	Wm. (William)
Cal. (California)	Jr. (Junior)
Esq. (Esquire)	Mr. (Mister)
e.g. (exempli gratia)	Me. (Maine)
i.e. (id est)	ft. (feet)

The period, usual in abbreviations, is limited, in the contracted words, to those terms which are commonly contracted. Although it is preferred to the apostrophe, the apostrophe is employed in words not usually contracted. The period is preferred whenever possible, and gives a better appearance.

Dept. (not Dep't)
ft. (not f't)
Jr. (not J'r)

4. *A period is to be placed before a decimal fraction.*

67.2480 miles	$67.14
3 071 feet	38.01
.004 grain	17 00
.016 inch	9 43

The period has been arbitrarily recognized as the proper dividing point between whole numbers and hundredths, while the colon divides whole numbers from sixtieths.

Questions

1. What is the difference between a declarative and an imperative sentence?
2. What is the difference between an indirect and a direct question?
3. When is it better to use the period for abbreviated words than the apostrophe?

JOB NO. 16—THE INTERROGATION-POINT

It is not always easy to determine the proper use of the interrogation-point. Cases occur in which it is doubtful whether the exclamation-point or interrogation-point is the more appropriate mark. There are also sentences merely assertive which are sometimes mistaken for interrogations on account of the use of the interrogative pronoun.

The test of proper interrogation to be established under all such circumstances is that the sentence must be a direct question, to which an answer is either expected or implied.

1. *An interrogation-point should be placed after a direct question.*

Can gold gain friendship?

Was the prisoner alone when he was arrested?

Can any man have a higher notion of the rule of right and the eternal fitness of things?

In order that the nature of a statement may be easily recognized, the punctuation-mark is useful, and the interrogation-point is perhaps the most emphatic of the marks used for this purpose.

2. *When two or more interrogative phrases or clauses, having a common dependence, appear in one sentence, the interrogation-point is placed at the end of the whole sentence.*

Was the bruise in the flesh, or did it extend to the bone?

What is the meaning of all this excitement, of all this tumult, of all this confusion?

Didst thou never hear that things ill got had ever bad success, and happy was it always for that son whose father for his hoarding went to hell?

Oh, who can hold a fire in his hand
By thinking on the frosty Caucasus,
Or cloy the hungry edge of appetite
By bare imagination of a feast?

Since the interrogation-point has the strength of the period, it cannot be used at any place without closing the statement. Therefore, an interrogation-point in the middle of a sentence is wrong. It is as unnecessary to use it within a sentence as it might be unnecessary to use the period within the sentence. An interrogation-point at the end of a sentence, containing any number of interrogative statements, is all that is necessary.

Interrogation-points within the sentence spoil the appearance of the text.

What is the meaning of all this excitement? of all this tumult? of all this confusion?

Canst thou not minister to a mind diseased?
Pluck from the memory a rooted sorrow?
Raze out the written troubles of the brain?
And with some sweet oblivious antidote
Cleanse the stuffed bosom of that perilous stuff
Which weighs upon the heart?

3. *Where a sentence is both interrogative and exclamatory, the interrogation-point should be used.*

Whither shall I turn? Alas, I have no choice!

O Shame, where is thy blush?

What's Hecuba to him, or he to Hecuba,
That he should weep for her?

Can such things be
And overcome us like a summer's cloud,
Without our special wonder?

Will all great Neptune's ocean wash this blood
Clean from my hand?

Since the interrogation-point is of an exclamatory nature, it serves the purpose where both interrogation and exclamation are desired. The exclamation-point in this case would not reach further than the exclamatory stage.

O Shame, where is thy blush!

4. *An interrogation-point enclosed within parentheses is used to challenge the accuracy of a statement or doubtful assertion.*

In the time of Homer, 850 (?) B. C., Rome was yet unthought of.

The modern system of punctuation was established in 1620 (?) by Aldus Manutius.

The North Pole was first discovered by Dr. Cook (?) in the year 1912.

Manco Capac arrives from China, and claims to have been sent by the Deity (?) to reclaim the tribes from savage life.

He is an honorable (?) man.

When it costs more to effect a saving (?) than the amount saved is worth, where is the profit?

Questions

1. What is the function of the interrogation-point?
2. Why should an interrogation-point not be placed within a sentence?
3. When a sentence is both interrogative and exclamatory, what punctuation-mark should be used?

JOB NO. 17—THE EXCLAMATION-POINT

The exclamation-point is properly used only in expressions which are meant to be purely exclamatory, but its use is often erroneously extended to statements for emphasis.

There is no particular rule for the employment of two or three exclamation-points in succession, but this is sometimes done by an author who wishes to accentuate more strongly some word or phrase; as, for instance, in the case of great wonder or as a token of derision.

1. *The exclamation-point is used at the end of a sentence expressing an invocation, command, emotion, passion, wonder, or surprise.*

Buy my flowers—oh, buy, I pray:
Would to God that ye were near!
Charge, Chester, charge!
Give me liberty or give me death!
Sail on, O Ship of State!
Sail on, O Union, strong and great!

The exclamation-point readily shows to the reader the nature of the sentence. Without it, the statement may often lack the force desired.

Buy my flowers—oh, buy, I pray.

2. *The exclamation-point should always be used at the end of the exclamatory sentence beginning with an interjection.*

Oh, piteous spectacle!
Oh, my brothers! Oh, my sisters!
Alas, that such things should be!
Oh, pilot, 'tis a fearful night!
O God, that bread should be so dear,
And flesh and blood so cheap!

There is an erroneous tendency to use the exclamation-point immediately after a term which is exclamatory in its nature. If the term is a part of the exclamatory sentence, the exclamation-point properly belongs at the end of the whole sentence.

The exclamation-point immediately following the term would cut that term off from the rest of the sentence, since the exclamation-point has the same strength to close a sentence as a period.

Oh! pilot, 'tis a fearful night!
Alas! that such things should be!

3. *The exclamation-point is placed after a word of ejaculation used independently.*

Ah! They have arrived.
"Alas!" cried he, "It is too late!"
Oh! I have lost my purse.
Hurrah! Hurrah! A victory!
"Magnificent! Glorious!" he exclaimed.

If the exclamation-point were not placed immediately after the independent interjection, it would seem as if that were a part of the statement.

Hurrah, hurrah, a victory!

4. *A purely exclamatory sentence beginning with an interrogative pronoun or adverb always takes the exclamation-point.*

How sweet the moonlight sleeps upon this bank!
What a piece of work is man—how noble in reason and how infinite in faculties!
How aptly the clever epigram of the German philosopher describes the dissensions in the various Protestant bodies today!
How small a part of time they share
That are so wondrous sweet and fair!

A good deal of confusion results in the treatment of sentences like the above. The test is simply as to whether the statement is interrogative.

The interrogation-point in this case would alter the sense entirely.

How sweet the moonlight sleeps upon this bank?

5. *Several exclamation-points are sometimes used together for special emphasis, as to intensify emotion or surprise, to express satire or ridicule, etc.*

Fire! Fire!! Fire!!!

Never! Never!! Never!!!

Malherbe observed that a good poet was of more service to the church or state than a good player at ninepins!!

His honor!! He has none.

Napoleon said that three things are needed for successful warfare: Money! Money!! Money!!!

One exclamation-point in each case would not give the emphasis desired.

Fire! Fire! Fire!

Some people like to use two or more exclamation-points in a case like the one below; but it should be borne in mind that the exclamation point possesses the nature only of emphasizing a questionable point but not really of challenging it.

He is an honorable!! man.

Questions

1. Can the exclamation-point ever be placed after an exclamatory word, and how?
2. When is it proper to use several exclamation-points at the end of a sentence?
3. Can the exclamation-point be used to challenge a questionable point?

UNIT V

PRINTERS' ARITHMETIC

Computation

JOB NO. 1—COMPUTATION OF SPACE—SOLID MATTER

JOB NO. 2—COMPUTATION OF SPACE—LEADED MATTER

Cost-Finding and Estimating

JOB NO. 3—ESTIMATING PAPER

JOB NO. 4—ESTIMATING PAPER (*Continued*)

JOB NO. 5—ESTIMATING PAPER (*Continued*)

JOB NO. 6—ESTIMATING PAPER (*Continued*)

JOB NO. 7—ESTIMATING PAPER (*Continued*)

JOB NO. 8—ESTIMATING INK

JOB NO. 9—ESTIMATING COMPOSITION

JOB NO. 10—ESTIMATING COMPOSITION (*Continued*)

JOB NO. 11—MEASURING TYPE FOR ESTIMATING

JOB NO. 12—MEASURING TYPE FOR ESTIMATING (*Continued*)

JOB NO. 13—MEASURING TYPE FOR ESTIMATING (*Continued*)

Commercial Work

JOB NO. 14—ESTIMATING BUSINESS-CARD

JOB NO. 15—ESTIMATING BUSINESS-CARD

JOB NO. 16—ESTIMATING LETTERHEAD

JOB NO. 17—ESTIMATING CIRCULAR

UNIT V

PRINTERS' ARITHMETIC

Computation

Under the subject of printers' arithmetic comes the computation of space—an important phase of the training and something which every printer should know. Here we have practical examples to work out—such as come up in every printing office.

JOB NO. 1—COMPUTATION OF SPACE—SOLID MATTER

The amount of space which a given manuscript will occupy in type is one of the problems with which the printer is constantly confronted. While, as a general rule, the duty of figuring this out is delegated to the foreman of the composing-room, yet it not infrequently devolves upon the one who prepares the copy to solve this complicated problem.

Under all circumstances, a knowledge of computation will, no doubt, be helpful to any employee in the composing-room, as well as to the copy-preparer.

A scientific system for the computation of space will be found useful when one is confronted with the task of estimating the number of pages in type a certain quantity of manuscript will make or of determining the size of type to be used for a given space.

It is comparatively easy to "cast up" a small job of a few pages; but when one has to deal with several hundred pages of manuscript, the task becomes a problem. Several methods have been devised, of which few have been found valuable for practical purposes. The method described here is, as far as is known, the most effective so far devised.

1. *It is first of all necessary to find the number of points to the length of the line and to the depth of the page. This is obtained by multiplying the size in picas by* 12, *or the size in inches by* 72.

Thus, if the length of the line is 18 picas, or 3 in., the number of points to that line will be 216.

$$18 \times 12 = 216 \text{ points}$$
$$3 \times 72 = 216 \text{ points}$$

If the depth of the page is 30 picas, or 5 inches, we get 360 points for the depth.

$$30 \times 12 = 360 \text{ points}$$
$$5 \times 72 = 360 \text{ points}$$

2. *The next thing is to determine the number of ems of the size to be used to the length of line and depth of page. This is obtained by dividing the number of points in each case by the number of points in the sizes of type required.*

If the type to be used is 10-point, we divide the number of points in the line (216) by 10. The result will be 21.6 ems. If the type is to be 8-point, the number 216 must be divided by 8, and the result is 27 ems to a 3-inch line. If the type to be used is 6-point, the result is 36 ems; and so on.

Now, we find that there are 360 points in the depth of a page of 5 inches. This amount divided by 10 will give 36 ems for the depth. Divided by 8, we get 45 ems; and by 6, 60 ems.

		Ems
10-point	216 ÷ 10 =	21.6
	360 ÷ 10 =	36
8-point	216 ÷ 8 =	27
	360 ÷ 8 =	45
6-point	216 ÷ 6 =	36
	360 ÷ 6 =	60

3. *The next operation is to multiply the number of ems in the length of the line by the number of ems in the depth of the page, and the result will give us the number of ems to the page.*

		Ems
10-point	21.6 × 36 =	777.6
8-point	27 × 45 =	1,215
6-point	36 × 60 =	2,160

4. *Next we are to find the approximate number of words to the page.*

In order to do this, we divide the number of ems by 3; for it is considered that the average length of the word is approximately 3 ems.[1]

				WORDS
10-point	777.6	÷ 3	=	259.2
8-point	1,215	÷ 3	=	405
6-point	2,160	÷ 3	=	720

Therefore, in a page 3 by 5 inches, there are approximately 259 words when the type is 10-point, 405 words when the type is 8-point, and 720 words when the type is 6-point. This same method may be used for any size of page.

Questions

1. What is the need for computation of space?
2. How is the number of ems within a given space to be determined?
3. How is the number of words within a given space found?

JOB NO. 2—COMPUTATION OF SPACE—LEADED MATTER

If the matter is to be leaded, the computation may be done in the same way, simply adding to each line the number of points which the leads will make, considering them as merely increasing the size of the type up and down the page, but not changing the actual number of ems in the line.

Assuming that 2-point leads are used, the 6-point type will become 8-point, the 8-point will become 10-point, and the 10-point type will become 12-point, and so on, while the width of the page will remain the same.

Therefore, when the page is 3 by 5 inches, and to be set in 10-point type, leaded, we figure the length of the line in terms of 10-point and the depth of the page in terms of 12-point (10-point, plus 2 points for leading).

3 in. (or 18 picas) = 216 points, or 21.6 ems of 10-point
5 in. (or 30 picas) = 360 points, or 30 ems of 12-point
21.6 × 30 = 648 ÷ 3 = 216 words

[1] It is generally agreed that the width of type varies with the size, and that, in the largest sizes, 2½ ems would be nearer correct as an estimate for the average word.

Hence, we get 216 words to a page 3 by 5 inches, 10-point leaded.

When the matter is set in 8-point type, leaded, we get the following results:

18 picas × 12 = 216 points ÷ 8 = 27 ems
30 picas × 12 = 360 points ÷ 10 = 36 ems
27 × 36 = 972 ems
972 ÷ 3 = 324 words to the page

In accordance with the preceding calculations, the following table has been determined, and shows, at a glance, the average number or words to the square inch that can be set in various sizes of type[1]—both for solid matter and for matter with one lead between the lines.

Where jobs of a large number of pages are to be figured on, this ready table will be found useful and labor-saving.

NUMBER OF WORDS TO THE SQUARE INCH

Size of Type	Words for Solid Matter	Words for Leaded Matter
5-point	69	49⅕
5½-point	57	41⅘
6-point	48	36⅔
7-point	35¼	27⅖
8-point	27	21⅗
9-point	21¼	17⅛
10-point	17¼	14⅕
11-point	14¼	11⅘
12-point	12	10⅛
14-point	9	7⅘
18-point	5¼	4⅔
24-point	3	2⅘

[1] The space which a given manuscript will make in type will always be governed by the "set" of type to be used and also, to a large degree, by the body size. A thin face will, of course, allow a greater number of words than a wide face in a given number of ems of composition. A normal face of 10-point is that in which the lower-case alphabet, "a" to "z," makes a line 12½ to 13 ems long of its own body-size. In 6-point of the same face, the alphabet, "a" to "z," would make a line 15 to 15½ ems long of its size.

The following concrete example will serve to illustrate the practical application of the table:

For example, we have to construct a book of 48 pages. Size of pages to be 3 by 5 inches. Type to be used is 8-point.

1. *Find the number of square inches to the page. This we get by multiplying the two dimensions of the page.*

$$3 \times 5 = 15 \text{ sq. in.}$$

2. *Find the approximate number of words to each page. This we get by multiplying the number of square inches to the page by the number of words contained in each square inch.*

$$15 \text{ sq. in.} \times 27 \text{ words} = 405 \text{ words}$$

3. *Find the approximate number of words to be contained in the 48 pages of the book. This we get by multiplying the number of words on one page by the number of pages of the proposed book.*

$$405 \text{ words} \times 48 \text{ pages} = 19{,}440 \text{ words}$$

Thus, we get 19,440 words to a book of 48 pages, 3 by 5 inches, set in 8-point solid.

4. *For Leaded Matter.—When 8-point matter is to be leaded, the following method may be used to get the results where the table is not at hand or its use is undesirable:*

We deduct from the sum total the space which the leads would occupy in square inches.

For example, in a page 5 inches deep (30 picas), we get 360 points; divided by 10, we get 36 lines of 10 (8 plus 2) points each.

Hence, we get 36 leads to the page.

$$36 \text{ leads} \times 2 \text{ points (thickness of lead)} = 72 \text{ points, or } 1 \text{ in.}$$

Each page gives us, then, 1 inch in depth by 3 inches in length.

This means 3 square inches of lead-space for each page.

$$48 \text{ pages} \times 3 \text{ sq. in.} = 144 \text{ sq. in. of lead space for the whole book}$$

This space is to be deducted from the 720 square inches which we get for the whole space.

$$720 \text{ sq. in.} - 144 \text{ sq. in.} = 576 \text{ sq. in. for the type-matter}$$
$$576 \times 27 \text{ words} = 15{,}552 \text{ words}$$

Thus, we get 15,552 words to a book of 48 pages, 3 by 5 inches, set in 8-point leaded.

5. *Illustrated Matter.—When cuts are to be used throughout the work it becomes necessary, first, to determine the amount of space all the cuts will occupy. For this purpose the cuts are to be measured and the number of square inches of space which they occupy ascertained.*

Thus, if, after measuring all the cuts, we find that they add up together 150 square inches of space, we deduct that space from the total allowed for the type-matter.

If the total amount of space allowed for the type-matter is 576 square inches, the space which the cuts will occupy is to be deducted.

576 sq. in. − 150 sq. in. = 426 sq. in.

If the manuscript is to be set in 8-point type, the result is to be multiplied by 27, and we get the number of words which it is possible to accommodate in the given space.

426 sq. in. × 27 words = 11,502 words

Thus, we get 11,502 words to a book of 48 pages, 3 by 5 inches, set in 8-point type, leaded, illustrated with cuts which occupy 150 square inches of space.

Table of the Type-Foundries.—The following table has been computed by the type-foundries of the United States. It will be found to differ slightly from the table based on our own calculations. Although the expertness of the type-foundries in this respect is unquestioned, the preceding table is recommended for use in preference to that of the type-foundries.

NUMBER OF WORDS TO THE SQUARE INCH

	WORDS		WORDS
5-point	69	10-point	21
5½-point	65	11-point	17
6-point	47	12-point	14
7-point	38	14-point	11
8-point	32	18-point	7
9-point	28	24-point	4

From the table supplied by the type-foundries, another table was prepared for leaded matter—which follows:

NUMBER OF WORDS TO THE SQUARE INCH FOR LEADED MATTER

	WORDS		WORDS
5-point	49⅕	10-point	17½
5½-point	47⅔	11-point	14
6-point	35⅕	12-point	12
7-point	29⅕	14-point	9⅗
8-point	25⅗	18-point	6½
9-point	23	24-point	3⅖

Estimating the Number of Words in a Manuscript.—Because the words of a language differ in length, it is not possible to estimate with absolute exactness the amount of space any considerable number of words will make in type. When the copy submitted is reprint or carefully typewritten, the process of estimating is greatly simplified; but in the cases of 100 or more pages of copy, in the handwriting of several persons, written on different sizes of paper, broken up into paragraphs and other divisions, with many breaks, and otherwise irregular with extracts, erasures, interlinings, etc., correct calculation becomes difficult.

"Casting off" the manuscript requires a careful examination of the copy itself, a thorough knowledge of the materials to be used, and some experience. Correct theoretical knowledge is valuable, but some practical experience is necessary to enable one to make a safe estimate.

The ordinary method of ascertaining the number of words in a manuscript is first to make a careful count of the number of lines on each page and then count the number of pages in the whole copy. This will give the total number of lines. Then count the words in some average lines of the copy, taking the lines here and there to get an average.

Example: If a manuscript of 125 sheets of typewritten copy has an average of 24 lines on each sheet, the total number of lines would be $125 \times 24 = 3{,}000$ lines. Next, if upon examination and a careful count of the number of words in 20

average lines, selected here and there throughout the copy, it is found that these lines contain the average of 12 words each, the total number of words would be 3,000 × 12 = 36,000. This is an approximate estimate, its accuracy depending, of course, upon the precision which the condition of the copy would permit for making the count.

Computation by Means of Letters.—A method more accurate, but requiring a good deal more time and labor, is that of counting the letters of a page of manuscript. Then it is necessary to compute the number of letters which it will be possible to accommodate in a given page of type-matter of a certain size.

When one page is computed, it is only necessary to base the same calculations approximately for all other pages of manuscript and type-matter.

Questions

1. How will leading affect the computation in a given space?
2. How is the space for cuts to be allowed in the computation of a book?
3. How is computation accomplished by means of letters?

Cost-Finding and Estimating

The subjects of cost-finding and estimating also come under the heading of "printers' arithmetic," and there is a great deal of opportunity for training here. The estimating of paper and ink are the first phases of the work to be taken up, and later come the estimating of composition, presswork, electrotyping, etc.

JOB NO. 3—ESTIMATING PAPER

Paper is to be figured according to the sheets required for the job. The size of sheet which most easily lends itself to the purpose and which will require the least waste is to be used; and, where cutting is necessary, should be cut so as to give the best results. The paper table should be consulted to find the most convenient size of paper to be used for a job.

TABLE OF SIZES AND WEIGHTS OF BOOK PAPERS

Basis 25 *by* 38							
22	by 32	30	37	44½	52	59½	74
24	by 36	36	45	55	64	73	91
25	by 38	40	50	60	70	80	100
26	by 29	32	40	48	56	63	79
26	by 40	44	55	66	77	88	110
28	by 42	50	62	74	86	99	124
28	by 44	52	65	78	90	104	130
29	by 52	64	80	96	112	126	158
30½	by 41	53	66	79	92	105	132
32	by 44	60	74	89	104	119	148
34	by 44	63	79	95	110	126	157
35	by 45	66	83	100	116	133	166
36	by 48	72	90	110	128	146	182
38	by 50	80	100	120	140	160	200
41	by 61	106	132	158	184	210	264
42	by 56	100	124	148	172	198	248
44	by 56	104	130	156	180	208	260
44	by 64	120	148	178	208	238	296

Ascertaining Quantity Required on Job.—After deciding on the kind of paper, the thickness, and weight, the size of stock which will cut to best advantage must be found.

A customer has brought in 241 pages of typewritten matter. The copy is on sheets 8½ by 11, double-spaced—300 words to the page. The customer wants a book in 10-point type, solid, and wants the pages 5 by 7, paper size. Allowing 1-inch margin all around, the type-size of pages will be 3 by 5 inches, or 15 square inches for each page. The object is to find out how much paper will be needed, and what will the paper cost, when the customer wants 1,000 copies of the book.

The copy consists of 72,300 words (241 pages × 300 words).

Computing the number of words per page of 15 square inches, we find 259 words per page.

Dividing 72,300 by 259, we get 279 plus, or 280 pages per book.

Using sheets of paper which will allow 16 pages to be printed on each side of the sheet, we get 32 pages for each sheet.

Dividing 280 by 32, we find that we need 9 sheets of paper for each copy of the book.

Multiplying 9 by 1,000, we find that we need 9,000 sheets of paper for the 1,000 copies. This is figured without spoilage —which is usually about 4 per cent.

Adding 4 per cent for spoilage, or 360 sheets, we get a total of 9,360 sheets for the whole job.

Supposing the ream weighs 40 pounds, and the paper costs 10 cents per pound, the ream will then cost $4.

We find then that we need 18 reams, plus 360 sheets, of paper. This will amount to $72 for 18 reams and $2.88 for 360 sheets. The total will be $74.88.

Questions

1. How is it possible to find the number of words for a page of given size?
2. To what extent would leads reduce the number of words to a page of given size; as, for instance, 3 by 5?
3. What size would the sheet of paper have to be on which could be printed 32 pages 5 by 7?

JOB NO. 4—ESTIMATING PAPER *(Continued)*

A job is to be printed on Antique 60-lb. paper (basis size, 25 by 38—60 lb.) The size of the job is to be 6¼ by 9½ inches (paper size). There are to be 5,000 impressions on the job. The paper costs 14 cents per pound.

The best size of paper to use here is 25 by 38. Sixteen copies can be secured from each sheet. There will be no waste:

25 by 38 (large sheet)
6¼ by 9½ (size of job)
4 × 4 = 16 copies

We need 5,000 copies. The next thing then is to find how many of the large sheets (25 by 38) will be necessary to complete the job.

5,000 ÷ 16 = 312½ sheets of 25 by 38

There should also be allowed a certain amount for spoilage. In this case we will allow 3½ per cent.

3½ per cent on 5,000 copies will be 175
175 ÷ 16 = 11 sheets of 25 by 38

There will, therefore, be 11 sheets for possible spoilage.

312½ + 11 = 323½, or 324 sheets

324 sheets will be necessary to produce the job of 5,000 copies.

The next step is to estimate the price for the paper. We know that the paper cost 14 cents a pound and that there are 60 pounds to the ream in the 25 by 38 size. Now, the ream consists of 500 sheets. Therefore, we find, first, what the price of the ream is:

60 lb. × 14 cents = $8.40 for 500 sheets
$8.40 ÷ 500 = 1.68 cents per sheet
324 sheets × 1.68 cents = $5.45

It will, therefore, cost $5.45 for 324 sheets of paper to produce the job.

Questions

1. What is the method used in determining the number of copies it is possible to cut out of a sheet of paper?
2. What is the reason for the allowance of spoilage on a job?
3. What is the unit of value in estimating the price of paper?

JOB NO. 5—ESTIMATING PAPER *(Continued)*

We have a job for which is required a Superfine White writing paper. This paper is equivalent to a sample sent, which is 17 by 22—24 lb. The size of job is 6 by 9; and there are 3,000 impressions required.

Size 17 by 22 will not cut to advantage. We therefore have to look for another size of paper. This we find in 19 by 24—32 lb. The paper is identically the same as sample; only the size is different. The paper is 20 cents per pound.

19 by 24 (size of sheet)
9 by 6 (size of job)
2 × 4 = 8 copies to the sheet

From this size we get 8 copies from each sheet. Since 3,000 copies are required, we must find out how many sheets of paper it will take:

3,000 ÷ 8 = 375 sheets of 19 by 24

For spoilage we must add 4½ per cent extra.

4½ per cent of 375 sheets = 17 sheets
375 + 17 sheets = 392 sheets (in round numbers, 400 sheets)

With the price of paper at 20 cents per pound, we proceed to find the cost per ream of 500 sheets. Ream weighs 32 pounds.

32 lb. × 20 cents = $6.40 per ream of 500 sheets

Next, the price per sheet and then the price for 400 sheets is obtained:

$6.40 ÷ 500 = 1.28 cents per sheet
1.28 cents × 400 = $5.12 for 400 sheets

The cost for the paper is, therefore, $5.12.

Questions

1. Who pays for the spoilage in paper?
2. Why is the percentage of spoilage smaller on larger quantities than on smaller quantities of paper used?
3. How is the price for a ream of paper determined?

JOB NO. 6—ESTIMATING PAPER *(Continued)*

Job on Mill Bristol Cardboard.—Twenty-five thousand cards are required, and the size of the card is to be 3⅛ by 5⅝. Paper is to be Mill Bristol, 120-lb.

We make three settings of the job to save presswork.

(3 by 3⅛) = 9⅜ by 5⅝

The size of bristol cardboard is 22½ by 28½. How many cards can we get out of one sheet of cardboard?

22½ by 28½ (size of large sheet)
5⅝ by 9⅜ (size of card in triplicate)
4 × 3 = 12 copies in triplicate (or 36 copies)

We can get 36 out of each large sheet of cardboard. The required amount is 25,000. We are now to find the number of sheets necessary for the whole job:

25,000 ÷ 36 = 694 (or 695 sheets)

The percentage of spoilage here is 2½; and 2½ per cent of 695 sheets will be 18.

695 sheets + 18 sheets = 713 sheets

The price per 100 sheets is $3.15. This makes 3.15 cents per sheet.

713 sheets × 3.15 cents = $22.46

Questions

1. What is the usual size of sheet of Bristol cardboard?
2. What is the unit of value for Bristol cardboard?
3. Is the opportunity for spoilage smaller or greater in printing cardboard than in printing ordinary paper, and why?

JOB NO. 7—ESTIMATING PAPER *(Continued)*

Book on Machine-Finish Paper.—A book of 320 pages, to be printed on machine-finish paper, at 10 cents per pound. The size of page is 7¾ by 10. It is to be 60-lb. paper. It is found best to have 8-page forms.

We find, on consulting the paper table (see page 117), that we can get size 22 by 32 — 44½ lb., which is the nearest and best size under the circumstances. Although a certain amount is to be allowed for trim, 22 by 32 is still a trifle too large; but there is no better, and therefore we will use that size.

22 by 32 (size of sheet)
10 by 7¾ (size of page—inverted)
2 × 4 = 8 pages to sheet

Since the book is to consist of 320 pages, it will require 20 sheets (printed on both sides, for each copy of the book).

16 pages on sheet (8 pages on each side) × 20 = 320 pages

16 pages on sheet (8 pages on each side) × 20 = 320 pages.

Therefore, we shall need 20,000 sheets for the 1,000 copies of the book.

20 sheets × 1,000 copies = 20,000 sheets

Spoilage here is 2½ per cent for each operation. The sheet goes twice through the press and is then to be bound,

which will require an allowance for spoilage altogether of 7½ per cent.

3 × 2½ per cent = 7½ per cent
7½ per cent of 20,000 sheets = 1,500 sheets
20,000 sheets + 1,500 sheets = 21,500 sheets
21,500 sheets equal 43 reams (500 sheets to the ream)

Now, since the price of the paper is 10 cents per pound, and there are 44½ pounds of paper to each ream, the price per ream will be $4.45.

44½ × 10 cents = $4.45
43 reams × $4.45 = $191.35

This paper is also carried in rolls, which, when used on a rotary press, may be cut to more economical size and still allow sufficient margin for trim. In cutting paper to 21 by 36, an inch is saved on every sheet. On 20,000 sheets, this will be quite an item.

The best method to use to discover what the saving would be, and what would be the price for the paper on the roll, is to find the weight per ream when the size of the paper is 21 by 32.

We therefore proceed to get the weight by the usual process:

Multiply basic sizes	22 × 32 =	704
Multiply desired sizes	21 × 32 =	672
Multiply product of desired sizes by weight of known size	672 × 60 =	40,320
Divide result by product of basic sizes	40,320 ÷ 704 =	57.27

We find that a ream of paper 21 by 32, of the same thickness as the 22 by 32 — 60 pounds would weigh 57¼ pounds. We would therefore gain 2¾ pounds on each ream of the smaller size. On 43 reams this would be nearly 119 pounds of paper gained.

43 reams × 2¾ lb. = 118¼ (119) lb.

At 10 cents per pound, this would be a saving of $11.90. The price of paper when used in the roll would, therefore, be:

$191.35 − $11.90 = $179.45

Cover Stock for 320-Page Book.—A 90-lb. basis cover paper is desired for the book, and that is found in 40 by 48—200 lb. The price of cover paper is 24 cents per pound.

We need 1,000 covers, and we get 12 covers out of each sheet of 40 by 48. Since the size of inside pages is 7¾ by 10, the cover will have to be doubled in the width and will have to be a little wider, so as to cover fully the inside pages. One-half inch would be sufficient for that purpose. This necessity does not exist with regard to the depth of the page. The size of cover will, therefore, be 10 by 16.

40 by 48 (size of sheet)
10 by 16 (size of cover)
4 × 3 = 12 covers to sheet
1,000 covers ÷ 12 = 83.3 (or 84) sheets required

Percentage of spoilage—4½ per cent for printing and 2 per cent for bindery.

6½ per cent of 84 sheets = 5 sheets
84 sheets + 6 sheets = 90 sheets

Price of stock is 24 cents per pound. There being 200 pounds to the ream, the price per ream will be $48. Price per sheet will be 9.6 cents:

$48 ÷ 500 = 9.6 cents per sheet
90 × 9.6 = $8.64 (price for 90 sheets)

Questions

1. What is the reason for the allowance for trim?
2. What is the method used in determining the weight of a ream of paper of a certain size when the weight of the same kind of paper for another size is known?
3. Why is the percentage of spoilage in the bindery smaller than on the press?

JOB NO. 8—ESTIMATING INK

In estimating ink, a table is used which shows the amount of ink that is needed for every kind of form and job. The student will use this table to figure the amount of ink needed on the particular job in question.

BLACK-INK SCHEDULE FOR PLATEN PRESSES

		5 by 8		8½ by 11		10 by 15		13 by 19		14 by 22	
		Make-Ready	1,000 Run	Make-Ready	1,000 Run	Make-Ready	1,000 Run	Make-Ready	1,000 Run	Make-Ready	1,000 Run
Solid Plates	Rough	0.15	0.60	0.25	1.25	0.30	2.11	0.35	3.40	0.40	4.30
	M. F.	0.15	0.45	0.25	1.00	0.30	1.55	0.35	2.55	0.40	3.25
	S. & S. C.	0.15	0.30	0.25	0.65	0.30	1.05	0.35	1.70	0 40	2.14
	Coated	0 15	0.25	0.25	0.59	0.30	0.93	0.35	1.53	0.40	1.93
Heavy Plates and Type	Rough	0 12	0.28	0.20	0.55	0.24	1.00	0.28	1.60	0 32	2.00
	M. F.	0.12	0.20	0.20	0.45	0.24	0.65	0.28	1.10	0.32	1.48
	S. & S. C.	0.12	0.14	0.20	0.30	0.24	0.47	0.28	0.75	0.32	1.00
	Coated	0.12	0.12	0.20	0.25	0.24	0.40	0.28	0.65	0 32	0.87
Catalog with Illustrations	Rough	0 06	0 05	0.10	0.12	0.13	0.17	0.16	0.25	0.20	0.34
	M. F.	0.06	0.04	0.10	0.10	0.13	0.12	0.16	0.21	0.20	0.25
	S. & S. C	0.06	0.03	0 10	0 08	0.13	0.10	0.16	0.14	0.20	0.17
	Coated	0.06	0.03	0.10	0 07	0.13	0.09	0.16	0.12	0.20	0.15
Book-Work Open Display	Rough	0.05	0.03	0.08	0.07	0.10	0.11	0.12	0.17	0.13	0.22
	M. F	0.05	0.03	0.08	0.06	0.10	0.08	0.12	0.14	0.13	0.17
	S. & S. C.	0.05	0.02	0 08	0.04	0.10	0.06	0.12	0.09	0 13	0.11
	Coated	0.05	0 02	0.08	0.04	0.10	0.05	0.12	0.08	0.13	0.10
Very Open Light Forms	Rough	0 04	0 02	0.05	0.05	0.06	0.07	0.08	0 12	0 09	0.15
	M. F.	0 04	0 02	0.05	0.04	0.06	0.06	0.08	0.10	0.09	0.12
	S. & S. C	0.04	0.01	0 05	0.03	0.06	0.05	0.08	0.06	0.09	0.08
	Coated	0.04	0.01	0.05	0.03	0.06	0.04	0.08	0.05	0.09	0.07

How to Find the Amount of Ink Necessary to Print a Given Job.—The problem may be to find how much ink would be required to print 5,000 circulars with moderately open display, printed from type, in one color—black. The press used will be 10 by 15. Antique paper.

We find that the make-ready will consume 10 units (.10).

We need 11 units (.11) per thousand impressions for running press. This makes 55 units (.55) for 5,000 impressions. Make-ready and run together will amount to 65 units (.65).

The price of ink is $1 per pound. Therefore, it would cost 65 cents for ink on this job.

Questions

1. Why does it require just as much ink for make-ready on a job printed on rough paper as on a job printed on machine-finished paper?
2. Why is more ink used in running a job of solid plates than in running a job of book-work?
3. Why is more ink required in printing a job on machine-finished paper than on a job on rough-finished paper?

JOB NO. 9—ESTIMATING COMPOSITION

In analyzing the various elements which go in the construction of a job of printing, we begin with composition, because this labor performed on the manuscript is the first done on a job coming into the printing office.

Classes of Composition.—Composition is divided into three classes:

1. Hand composition
2. Linotype composition
3. Monotype composition.

Hand composition includes all such labor of composition as is done by hand, such as display-work, make-up, and lock-up. Commercial stationery, advertisements, small pamphlets, booklets, hand-work on catalogs, books, magazines, and display of all kinds by hand are illustrations of this kind of labor.

Newspapers, books, magazines—the reading-matter of which are usually set on the linotype—use a great deal of this kind of composition. Linotype composition is also used on many advertisements and display-jobs—in fact, on almost all kinds of jobs.

Although the monotype is more costly than the linotype, it is preferable for certain kinds of composition—particularly, in work where many changes are to be made after the matter has been set. Many books, magazines, and other commercial jobs contain monotype composition.

Methods for Determining the Value of Composition.—Two methods are used in determining the value of composition—the hour method and the 1,000-em method.

For all hand composition and small quantities of machine composition, the hour method is usual—that is, the work is gaged by the number of hours it takes to set it.

For machine composition of large quantities, the usual method is to measure the number of ems contained, and the price is rated at so much per thousand ems.

Measuring of Type.—Type should be measured according to the size of face, not on size of body. For instance, 6-point on 8-point body should be measured as 6-point; 8-point on 10-point body should be measured as 8-point. All sizes over 11-point should be measured as 11-point.

Where straight matter, set by hand, such as fine book-work, is set in large quantities, it may be valued on the basis of measurement, although this is of rare occurrence today. An average hand-compositor sets 700 ems per hour.

Machine composition in small quantities is usually based on the time method; this being considered the most equitable arrangement. Anything under 3,000 ems is considered a small quantity. It is generally considered not advisable to set small quantities of straight matter on the machine, unless it can be bunched with other small or large quantities. This is possible only when the different jobs are to be set in the same size of type.

Different Classes of Composition.—1. *Display Composition.*—This includes all matter where different kinds and sizes of types are used within the job, such as, advertisements, commercial stationery, circulars, etc.

2. *Plain Matter.*—Type-matter of the same kind and size of type, such as, the reading-matter of books, magazines, newspapers, pamphlets, booklets, etc.

3. *Tabular Matter.*—Matter with more than two columns of figures, or all rule-and-figure work, or rule work without figures.

4. *Figure-Work.*—This includes price-lists and other matter of a descriptive kind and two columns of figures, or other work requiring double justification.

5. *Book-Work.*—Straight-matter composition, including all the necessary work to produce the whole job. The make-up

of the book, the running-heads, and the various headings would be included in this work.

6. *Newspaper and Periodical Work.*—All such work as is required in the composition of trade journals, magazines, and newspapers.

7. *Catalog Work.*—This is usually a combination of display-work and straight-matter composition, including a lot of make-up—particularly, where there are illustrations.

Questions

1. How many classes of composition are there, and what is the nature of each?
2. How is the value of composition determined?
3. What is the difference between the hour method and the 1,000-em method in determining the value of composition?

JOB NO. 10—ESTIMATING COMPOSITION *(Continued)*

Measuring Composition.—1. *Display Composition.*—Display-work or job-work is usually not measured. This work is, in most cases, figured on a time basis. But where this display is found among a great deal of straight matter, it is usually measured together. This method is adopted in the case of headings and subheadings found with straight matter and where a few display-lines are found interspersed here and there within the reading-matter.

Sometimes display composition is also measured where it occurs in greater abundance, as in the case of catalogs and pamphlets, where much display-matter may be used.

Where display in larger quantities are to be measured, it is necessary to have a certain system to follow. The following has been evolved through many years of experience, and it is generally accepted as safe:

(*a*) It will take about the same amount of time to fill a given space with ordinary display-matter as it will to fill that space with 8-point solid straight matter. Therefore, such display-matter should be measured like 8-point solid matter, and charged accordingly.

(*b*) Moderately open display-matter, for similar reasons, should be measured like 10-point solid straight matter.

(*c*) Very open display, because that would take less time to fill a given space, should be measured like 11-point or 12-point straight-matter type.

(*d*) Where advertisements are measured—and that is sometimes done—they should be measured like 6-point solid matter when the type used in the advertisement is larger than 6-point. Where advertisements contain type smaller than 6-point, a special arrangement should be made for the charge when time-work is not desirable.

The reason for a higher rate for advertisements is that it requires a longer time to set them than ordinary display—due to the thought which is to be given to the proper display of the various lines.

2. *Plain Matter.*—In large quantities—that is, 3,000 ems or over—straight-matter composition is usually priced per 1,000 ems—which is the unit of measurement. In smaller quantities—that is, less than 3,000 ems—it is usual to adopt the time-rate; although the time-rate is sometimes also used for large quantities of straight-matter composition. Any display-matter occasionally interspersed is measured together with the body-type.

3. *Tabular Matter.*—This class of composition, when it is measured, is charged twice the amount of plain matter. It is quite usual, however, to use the time-rate on this kind of work.

4. *Figure-Work.*—Figure-work is charged one and one-half times as much as plain matter when it is measured. This kind of work is also often charged by the time-rate.

5. *Book-Work.*—Book-work usually includes all the work necessary to prepare the job for the press. This would include, besides the composition, also the make-up, proofreading, foundry lock-up, electros, imposition, press lock-up, etc. A rate is often made for this work with the page as the unit of value.

6. *Newspaper and Periodical Work.*—This class of work is either valued with the page as the unit or on the basis of time. When the page is the basis of value, it is usual to charge a higher rate for the advertising pages.

7. *Catalog Work.*—It is usual to arrange the method of charging for catalog work on the basis of the page-rate. Sometimes the time-rate is adopted.

It is, of course, understood, where the time-rate is adopted for catalog work, that the charge for the work is usually determined after the job is completed. It is not easy to find the cost per page at the time-rate—although that is sometimes done. The advantage of the 1,000-em rate is that it is easier to determine the cost beforehand.

In this work there are a number of operations to be taken into consideration:

(*a*) Here we have a good deal of display-matter interspersed with straight matter; and it is, therefore, not easy to get good results from measuring this work.

(*b*) Most catalogs are illustrated. Therefore, we have also to consider the handling of cuts. An extra charge should be made for this work. Handling of cuts will involve their preparation to fit in with type-matter. This work may take from 2 to 10 minutes on each cut.

All these elements should be taken into consideration, and charges made accordingly. The safest method is to arrange this work on a time-basis.

Questions

1. How may display composition be measured?
2. What is the difference between tabular matter and figure-work?
3. Why should advertising pages be higher priced than text-pages?

JOB NO. 11—MEASURING TYPE FOR ESTIMATING

As has been seen, in order to find the number of ems of type in a certain given job of straight matter, we measure the width of the measure and the depth of it. Then we find the number of points in each. Next, we divide each dimension by the size of type used—which gives us the number of ems in each dimension. Finally, we multiply the two results by each other, and get the number of ems in the whole job.

Let us suppose, in measuring the width of a given galley-proof, that we find it to be 4 inches, or 24 picas.

In measuring the depth, we find it to be 19 inches, or 114 picas.

4 in. × 72 points gives us 288 points for the width; or 24 picas × 12 points gives us 288 points—the same result.

19 in. × 72 points gives 1,368 points for the depth; or 114 picas × 12 points gives 1,368 points.

Dividing 288 points by 10 (size of type used), we get 28.8 ems.

Dividing 1,368 points by 10, we get 136.8 ems.

Multiplying the two, we get 3,939.84, or, approximately, 3,940 ems for the whole job.

At the rate of $1 per 1,000 ems, it will cost $3.94 to set this job of 10-point type.

From the above calculations, we may construct a table for the number of ems to the square inch for any given size of type. This table would be as follows:

1 sq. in. of 6-point type contains 144 ems
1 sq. in. of 8-point type contains 81 ems
1 sq. in. of 10-point type contains 51.84 ems
1 sq. in. of 12-point type contains 36 ems
1 sq. in. of 14-point type contains 26.44+ ems
1 sq. in. of 18-point type contains 16 ems

Questions

1. How can the number of ems of type-matter be found?
2. How is the cost of linotype composition found?
3. Why does it cost more to set 10-point linotype composition than 8-point?

JOB NO. 12—MEASURING TYPE FOR ESTIMATING *(Continued)*

On this job we wish to determine the number of ems of straight-matter type and find what it would cost to set it at $1.10 per 1,000 ems.

This job is of 10-point type, set on a 12-point body—which is the same as if it were leaded. The spacing is measured in and charged as composition.

Measuring the width, we find that it is 3½ inches, or 21 picas. Measuring the depth of pages, we find the following:

1 page at about 3¾ in., or 23 picas
6 pages at 6 in. each, or 36 picas each

Together, this makes 23 picas plus 216 picas = 239 picas, or, 3¾ inches plus 36 inches = 39¾ inches.

21 picas × 12 (or 3½ inches × 72) gives 252 points for width.

239 picas × 12 (or 39¾ inches × 72) gives 2,868 points for depth.

Dividing 252 by 10, we get 25.2 ems for the width.

Dividing 2,868 by 10, we get 286.8 ems for the depth.

Multiplying 25.2 by 286.8, we get 7,227.36 ems for the whole job.

At $1.10 per 1,000 ems, it would cost $7.95 to set the whole job.

When the job is of many pages, it is usual to find the number of ems for each page separately, but in a job like this—of a few pages—it is easier to figure all the pages together.

When using the table, we would first multiply the two dimensions in inches (3½ by 39¾). Then the result would be multiplied by the number of ems within a square inch (51.84). This would give us the number of ems for the whole job, and we could then proceed to find the price.

Ordinarily, the use of the table would make the work much simpler; but, in some instances—as with 10-point and 14-point type—there is also quite a bit of figuring with the use of the table.

Questions

1. How is 10-point type on a 12-point body measured?
2. Why is the spacing between lines measured in in the price of composition?
3. What is the best method to use in measuring linotype composition for a job of 320 pages?

JOB NO. 13—MEASURING TYPE FOR ESTIMATING *(Continued)*

Our problem here is to find the amount of straight-matter ems and to determine the cost.

We have, in this job, several things to consider: first, the number of 10-point ems; secondly, the number of 10-point ems with italic lines; and, thirdly, the number of 8-point ems of tabular matter. Each one of these items must be figured separately.

Examining the pamphlet, we find the following results for our work in estimating straight-matter composition (omitting all display and make-up):

Page	
1	3½ by 3½ in.—10-point type, leaded
2	3½ by 6 in.—10-point type, leaded
3	3½ by 6 in.—10-point type, leaded
4	3½ by 6 in.—10-point type, leaded
5	3½ by 2½ in.—10-point type, leaded
5	3½ by 3½ in.—8-point type, tabular matter
6	3½ by 6 in.—10-point type, with italic
7	3½ by 6 in.—10-point type, with italic
8	3½ by 6 in.—10-point type, with italic
9	3½ by 6 in.—10-point type, leaded
10	3½ by 6 in.—10-point type, leaded
11	3½ by 5 in.—10-point type, leaded

First of all, we take the plain 10-point type, and find the number of ems on each page. We find first the number of points, and then the number of ems to each dimension, and multiply the results. We get the following results through our calculations:

10-Point Roman

Page	Ems
1	635.04
2	1,088.64
3	1,088.64
4	1,088 64
5	529.20
9	1,088.64
10	1,088.64
11	1,088.64
Total	7,696.08

10-Point, with Italic Lines

Page	Ems
6	1,088.64
7	1,088.64
8	1,088.64
	3,265.92

8-Point Tabular Matter

5	992.25

The 10-point type, with leads, is figured at $1.10 per 1,000 ems—regular price. The 10-point type, with italic lines, is figured at price and a half—$1.65 per 1,000 ems. The 8-point tabular matter is figured at double price—$2.20 per 1,000 ems.

7,696 ems at $1.10 per 1,000 ems amounts to	$ 8.47
3,265 ems at $1.65 per 1,000 ems amounts to	5 38
992 ems at $2.20 per 1,000 ems amounts to	2 18
	$16 03

All the straight-matter composition on this job will amount to $16.03.

Questions

1. How is the price for composition with italic lines determined?
2. What is the custom in determining the value of tabular composition?
3. Why is the price for composition with italic lines higher than plain composition?

Estimating on Commercial Work

When there is a job to estimate, one very important element is to know the number of hours it will take, in each department of the factory, to construct it. The next problem, is to know what to charge per hour of work in each department. The first of these two elements is a matter of calculation in each individual case, where judgment always enters. The second element is entirely a matter of mathematics; for, if the price per hour of production is known, that price is simply multiplied by the number of hours it takes to produce.

Another thing to be considered is paper. The size that will cut to best advantage must be found—that is, the size that will produce the least waste. Where estimating is done on jobs with many pages—where 8-page, 16-page, 32-page, or 64-page forms are printed—it is necessary to allow a sufficient amount of margin on each side for trimming after the sections are stitched together. The estimator must also not forget to allow a certain amount of sheets for spoilage

The printer, being considered as the wholesaler in the buying of paper, may charge his customer a profit on all paper bought for his job. This charge may vary from 20 to 25 per cent. This profit charge, in fact, may be extended to all outside articles procured for the job in question. The printer, under these circumstances, is like the merchant, who buys in large quantities and retails his goods to buyers in small amounts.

For the present purpose—which is the study of estimating—the prices given (being the market prices at the present time) are as good as any, since they are useful in acquiring a knowledge in the methods of estimating.

In estimating ink, the table given here is practical and is particularly simple to consult and operate. The decimal system —dividing the pound into tenths and hundredths—makes it easy to determine the cost of ink for a particular job, because that system coincides with that of the monetary system. The price per pound of ink is easily calculated, since all ink manufacturers are ready to furnish prices on request. The estimator may add a profit charge for ink—this being an outside article—from 20 to 25 per cent.

The cost of the various operations of bindery work may be comptued by consulting the price-lists issued by the trade in question. The prices given here are those at present in force, and will be useful for the purpose herein.

The prices given in the various tables are the present market prices, and may be used for the purposes of estimating. These, however, are subject to change from time to time. In the study of estimating, any prices may be used with equally good results, since the study of method is the important thing; and facility

in using the knowledge acquired and experience, with the help of the tables and scales, is sought.

No profit need be added in estimating with the prices here given (with the exception of paper and ink), since a profit charge of 25 per cent is included in these market prices. When prices are used which show merely the cost of production, the estimator may add a profit charge of 25 per cent—which is considered reasonable and just for the printer's efforts.

JOB NO. 14—ESTIMATING COMMERCIAL FORMS—BUSINESS-CARD

The printer gets an order to print a thousand cards, like sample (see Fig. 54). The following are the particulars:

Card stock: 2 by 3½ inches. No. 26, Vellum Finish, at $1.68 per 1,000.

Composition: Like sample, at $3.75 per hour.

Lock-up for press: 10 by 15, at $3.75 per hour.

Presswork: Press 10 by 15, or smaller, at $1.90 per hour (1,000 impressions per hour).

Ink: Black ink, at $1 per pound. The pound is divided into 100 units, and we figure by these units.

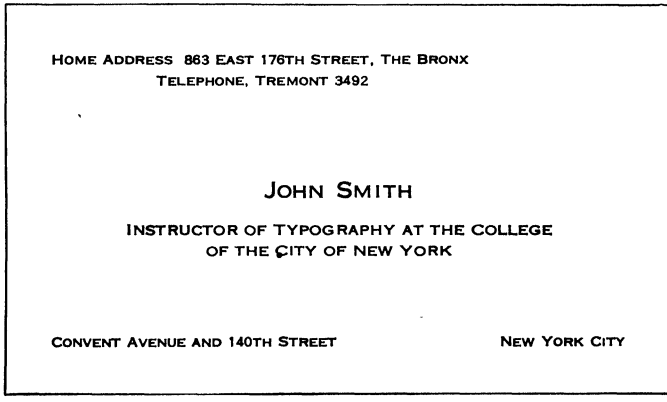


FIG. 54.—Business-Card

INDIVIDUAL COST

Card stock—1,000	$1 68
Profit, 25 per cent	.42
Composition—½ hr	1 88
Lock-up—¼ hr	.94
Presswork—1 hr	1.90
Ink—Make-ready, 0.5 (5 units, or 5/100 of a pound) 1,000 Run, 0.3 (3 units, or 3/100 of a pound) Total, 8 units of ink, $1 per 100	.08
Profit—25 per cent	.02
Total for the job	$6.92

Outside items—such as paper and ink—require the addition of a profit of 25 per cent when estimating. The other items have the profit included in the prices. The overhead expense —such as, rent, light, heat, office salaries, etc.—are also included in the price per hour for the various items.

Questions

1. How is the price for display composition determined?
2. In estimating on a business-card, what is the usual order of procedure?
3. Why should a profit-charge be added on the cost of paper and ink in estimating?

JOB NO. 15—ESTIMATING COMMERCIAL FORMS—BUSINESS-CARD (*Continued*)

Customer wants 1,000 cards, like sample (see Fig. 55). The following are the particulars on the job:

1,000 cards—2⅜ by 3⅞ inches, on Bristol cardboard, 22½ by 28½; stock at $3 per 100 sheets.

Composition: Like sample—two forms, one for each color, at $3.75 per hour.

Lock-up for press: Two forms, at $3.75 per hour.

Presswork: Press 10 by 15—two forms, at $1.90 per hour.

Ink: Two colors, black and green—black at $1 per pound of 100 units, green at $1.50 per pound of 100 units.

FIGURING THE COST

Paper stock: 22½ by 28½ will allow 63 cards per sheet:

$$\begin{array}{r} 22\tfrac{1}{2} \text{ by } 28\tfrac{1}{2} \\ 2\tfrac{3}{8} \text{ by } 3\tfrac{7}{8} \\ \hline 9 \times 7 = 63 \end{array}$$

Nine cards may be cut the 22½-inch way, and seven cards may be cut the 28½-inch way; which will give us 63 cards from each sheet.

Spoilage: We figure that a certain number of cards will be spoiled during printing; so we must allow for that. Since the job is being printed in two colors, we allow a certain percentage for each color—4½ per cent on the first color and 2½ per cent on the second color. This large percentage is necessary on small quantities.

Allowing 7 per cent for spoilage (4½ per cent plus 2½ per cent), we will need 70 extra cards:

7 per cent of 1,000 = 70

Adding 70 to 1,000 cards, we have 1,070 cards necessary to print the job.

We found that we could get 63 cards from each sheet of Bristol cardboard. Therefore, we shall need 17 sheets for the whole job, including the spoilage:

1,070 ÷ 63 = 16.98 (or 17 sheets)

Card stock—17 sheets, at 3 cents per sheet ($3 per hundred sheets), Bristol cardboard, 22½ by 28½	$0.51
Profit—25 per cent	13
	$0.64

Composition: Two forms, one for green color and one for black color. Each form will take ½ hour to set. Together, the composition will take 1 hour.

1 hr. composition at $3.75 per hour	$3.75

Lock-up for press: Schedule shows that it would take .16 (16 units, or $^{16}/_{100}$ of an hour) to lock up each form for press 10 by 15, or smaller. It would take .32 (32 units, or $^{32}/_{100}$ of an hour) to lock up both forms.

The time for plate-forms or slug-forms would be less than this. In this case, we are locking up type-forms.

Lock-up—.32 (32 units, or $^{3}2/100$ of an hour), at $3.75 per hour of 100 units $1.20

Ink: Two colors—black and green (the rules on this card are in green ink). The schedule shows that it will require .05 (5 units, or $5/100$ of a pound) of ink to make ready, or prepare, the black form, and that it will require .03 (3 units, or $3/100$ of a pound) of ink for each thousand run on the black form. There being 1,000 run, we shall need .05 plus .03, making .08 (8 units, or $8/100$) for the black form. The schedule shows that we

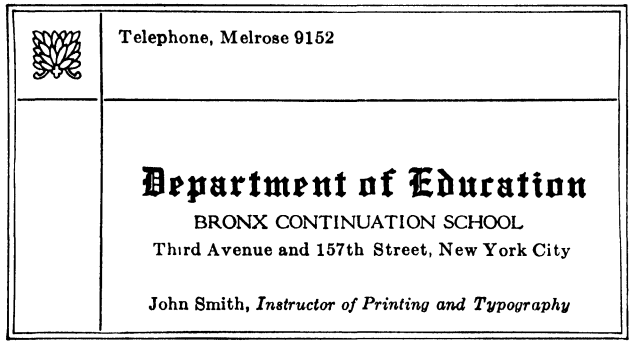


FIG. 55.—Business-Card

shall need 25 per cent more of ink when running green color. Therefore, we shall need .05 plus .01, or .06 ($6/100$ of a pound) for make-ready on green form, and .03 plus .01, or .04 ($4/100$ of a pound) for 1,000 run. There being 1,000 run, we shall need .06 plus .04, or .10 ($^{1}0/100$ of a pound) for green form).

Ink: Black form, at $1 per pound of 100 units	8 units	$0.08
Green form, at 1.50 per pound of 100 units	10 units	.10
Total		$0.18
Profit—25 per cent		.05
Grand total		$0.23

Presswork: Press 10 by 15, or smaller, at the rate of 1,000 impressions per hour. (Two forms—black and green—each 1,000 run, will require 2-hour run on the press.)

Presswork—Press 10 by 15, 2 hr. at $1.90 per hour. . $3.80

The prices for items of composition, lock-up, and presswork include a profit of 25 per cent for the print. They also include the cost of all overhead—such as rent, light, heat, office salaries, etc. For outside items—such as paper and ink—a profit of 25 per cent should be added to the price.

TOTAL COST OF JOB

Stock (including profit)	$0.64
Composition	3.75
Lock-up for press	1 20
Ink (black and green, including profit)	0 23
Presswork	3 80
Total for job	$9.62

Questions

1. What is the best method to use in determining the amount of time it would require to set a job?
2. Why does it take a longer time to lock a type-form than it would a plate-form?
3. Why does it require a greater quantity of ink to run a job in color than in black ink?

JOB NO. 16—ESTIMATING COMMERCIAL FORMS—LETTERHEAD

Customer desires 1,000 letterheads, like sample (see Fig. 56). The following are the particulars on the job:

1,000 Letterheads, 8½ by 11. Paper stock—17 by 22—20 lb., at 20 cents per pound.

Composition: Like sample at $3.75 per hour.

Lock-up for press: One form—small press, at $3.75 per hour.

Presswork: Press 10 by 15, at $1.90 per hour.

Ink: Black ink, at $1.25 per pound of 100 units.

FIGURING THE COST

Paper Stock: Bond, 17 by 22—20 lb., at 20 cents per pound. We can get four letterheads from each sheet of 17 by 22:

$$\begin{array}{r} 17 \quad \text{by } 22 \\ 8\tfrac{1}{2} \text{ by } 11 \\ \hline 2 \quad \times \quad 2 = 4 \end{array}$$

We may cut two letterheads each way, which will give us four altogether.

Spoilage: Allowing 5 per cent for spoilage, we shall need 50 additional letterheads, which will make 1,050 letterheads.

Dividing 1,050 by 4, we find that we shall need 263 (or 270) sheets of 17 by 22 to print our job.

A ream, consisting of 500 sheets, weighs 20 lb., and it costs 20 cents per pound. Therefore, the whole ream of 500 sheets costs $4.

If 500 sheets cost $4, how much will 270 sheets cost?

There are several different ways of figuring this. We may find first how much one sheet will cost by dividing $4 by 500. This will give us 0.8 per sheet, or ⅘ cent. Multiplying this by 270, we get $2.16.

If 500 sheets cost $4—

1,000 sheets will cost	$8.00
100 sheets will cost	.80
10 sheets will cost	08
1 sheet will cost	.008

We need 270 sheets—which means two times 100 and seven, times 10. Multiplying their equivalents the same way, we get:

$$\begin{array}{rr} 2 \times 0.80 = & 1.60 \\ 7 \times 0.08 = & .56 \\ \hline & \$2.16 \end{array}$$

Paper stock—270 sheets of paper, at 8 cents per sheet.....	$2.16
Profit—25 per cent.....	.58
	$2.74
Composition—like sample—1 hr., at $3.75 per hour.....	3.75
Lock-up for press—10 by 15 press—16 units, at $3.75 per hour of 100 units.....	.60
Presswork—Press 10 by 15—at $1.90 per hour—1,000 impressions per hour—1 hr	1.90
Ink—Black ink, at $1.25 per pound—5 units for make-ready and 3 units per 1,000—8 units, at 1.25 cents per unit.....	.12
Profit—25 per cent.....	.03
Total for job.....	$9.14

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FIG. 56.—Letterhead

Questions

1. What different methods may be used in determining the price of a quantity of paper less than a ream?
2. Why is the price for presswork determined by the size of the press?
3. How is the time for cutting the paper and packing taken care of?

JOB NO. 17—ESTIMATING COMMERCIAL FORMS—CIRCULAR

Customer wants 3,000 circulars—8¼ by 12—like sample (see Fig. 57). The following are the particulars on the job:

Paper stock: 8½ by 12, Antique Paper—25 by 38—60 lb., at 11 cents per pound.

Composition: Linotype work, at—$1.88 per 1,000 ems—this being work for which price and a half is charged. (The

regular price for this linotype composition would be $1.25 per 1,000, but this composition has a number of italic lines.)

Hand composition—display-work on the circular, at $3.75 per hour.

Lock-up for press: Small press, 10 by 15, at $3.75 per hour of 100 units.

Presswork: Press 10 by 15—1,000 impressions per hour, at $1.90 per hour.

Ink: Black ink, at $1.25 per pound of 100 units.

FIGURING THE COST

Paper stock: 25 by 38—60 lb., at 11 cents per pound. We can get nine circulars (8½ by 12) out of one large sheet:

$$\begin{array}{r} 25 \quad \text{by } 38 \\ 8\tfrac{1}{2} \text{ by } 12 \\ \hline 3 \quad \times \quad 3 = 9 \end{array}$$

We may cut three copies each way, which will give us nine altogether.

Spoilage: It would be necessary to allow 4½ per cent of spoilage for this job—which would amount to 135 extra copies on 3,000. Adding this to 3,000, we have 3,135 copies needed to complete the job. Since it would be possible to get nine copies out of each sheet, we would need 348.3 sheets to complete the job:

$$3{,}135 \div 9 = 348.3 \text{ sheets}$$

The next question is: What will 348 sheets cost?

A ream of 500 sheets—weighing 60 lb., at 11 cents per pound—would cost $6.60:

$$11 \text{ cents} \times 60 \text{ lb.} = \$6.60$$

This would amount to 1.32 cents per sheet:

$$\$6.60 \div 500 = 1.32 \text{ cents}$$

Multiplying 348 sheets by 1.32 cents, we get $4.59.36:

$$348 \times 1.32 = \$4.59.36$$

That is, the paper will cost $4.60.

Using another method of figuring:

If 500 sheets cost $6.60—

1,000 sheets will cost	$13 20
100 sheets will cost	1.32
10 sheets will cost	.13.2
1 sheet will cost	01 32

We need 348 sheets—which will cost as follows:

3 × 1.32 (cost per 100)	3.96
4 × .13 2 (cost per 10)	.52 8
8 × 01.32 (cost per 1)	.10 56
	$4.59.36

Paper stock—3,135 sheets, at 1.32 cents	$4.60
25 per cent for profit	1 15
	$5 75

Composition: Two kinds of composition—linotype and hand-work.

Linotype composition: The 8-point type, double column, measures 3 inches (18 picas) in width and 12½ inches (both columns) in depth. This gives 37½ square inches of type-matter. Consulting our table, we find that, in 8-point type, we have 81 ems to the square inch. It is customary to include display-lines when there are only a few. So we can get the number of ems for our calculations by multiplying the number of ems by the number of square inches:

37½ by 81 = 3,037.5 ems

This linotype composition is worth price and a half, because there are quite a few display-lines in it. Therefore, we are to determine the price of composition at the rate of $1.88 per thousand ems:

Linotype composition—3,037.5 ems, at $1.88 per 1,000 .. $5 71

Hand composition, or display composition, at $3.75 per hour. Setting up all the display-lines—in wide measure—would take about ¾ hour.

Hand composition—¾ hr., at $3.75 per hour..... $2.82

Make-up—To put the page together—double up the linotype composition, and combine it with the display—would require ¼ hour, at $3.75 per hour.

Make-up—Making up page, at $3.75 per hour 94

Locking up for press—chase for 10 by 15 press, at the rate of $3.75 per hour. The table shows that it would require 0.16 (16 units, or $^{16}/_{100}$) of an hour for type lock-up.

Press Lock-up—16 units, at 3.75 cents per unit. 60

Presswork—Press 10 by 15—3,000 copies to be printed—1,000 per hour, at $1.90 per hour.

Presswork—3 hr. of presswork, at $1.90 per hour. 5 70

Ink—Black ink. The table shows that it would require .05 (5 units, or $^{5}/_{100}$ of a pound) of ink for make-ready, and .05 (5 units, $^{5}/_{100}$ of a pound) of ink for printing each thousand impressions, so that we shall need 5 units for make-ready and 15 units for the run of 3,000—which makes 20 units, or $^{20}/_{100}$ of a pound of ink.

Ink—20 units (or $^{20}/_{100}$), at 1.25 cents per unit ($1.25 per pound of 100 units).	.25
Profit—25 per cent.	06
	$0 31

Adding up the cost:

Paper	$ 5 75
Linotype composition.	5.71
Display composition.	2.82
Make-up	.94
Lock-up.	.60
Presswork.	5.70
Ink	.31
	$21 83

The printer will have to charge $21.83 for 3,000 copies of the circular, at the prices indicated for each operation.

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The object of this part of the course is to teach accurate typography Consideration is given to the various elements which make up the display of commercial forms

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General Typography

1 Types and Type Faces
2 Harmony and Appropriateness
3 Planning a Layout
4 Commercial Work
5 The Book
6. The Trade Journal
7. The Magazine
8 The Newspaper

Advertising Typography

1 Typography of Advertisements
2. The Message of Type
3. Advertising Display
4. Borders
5. Illustrations
6. Decorative Features
7 Newspaper Advertisements
8 Agency Advertisements
9 General Advertising
10. Posters, Car-Cards, Window-Cards
11 Book Jackets

PART II

Proofreading and Copy-Preparation

This part of course considers the practice of proofreading, and takes up every phase—from first to final reading Each student receives a proof of the same job and each job—galley proof, ad proof, page proof, stone proof, press proof—is taken up separately and criticized openly

Each word, each line, the punctuation, capitalization, division of words, etc, are analyzed, and the typography and appearance of each proof are given consideration

Lectures on proofreading, customs, procedure, and administration of proofroom are given during term

Practical Work

1 Proofreading and Criticism
2 General Revising
3. Foundry and Final Reading
4 Stone Proofs, Press Proofs
5 Editorial Reading

Technical Lectures

1 Proofreaders' Marks
2 Proofreading
3 Procedure in the Proofroom
4 Rules and Methods
5 Consistency of Style
6 Consulting Reference Books
7 Preparation of Copy

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Cost-Finding and Estimating

This part of the course goes into the elements of cost and how to find them The cost of every phase of production and the value of each process is considered and estimated The various equipments and materials used in the printing product—type, presses, paper, electrotypes, ink, engravings, etc—are thoroughly analyzed and their values ascertained

Cost Finding

1 Finding the Cost
2 Cost Forms
3. The Cost Analysis Blank

Estimating

1 The Estimate
2 Composition
3 Computation of Space
4 Platen Press Work
5 Cylinder Press Work
6 Electrotyping and Stereotyping
7 Engraving
8 Paper and Ink
9 Estimating Job Work
10 Estimating Booklet
11 Estimating Catalog
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FIG. 57.—Circular

Questions

1. What is the advantage of emyloying the unit system of figuring time (decimal system, dividing the hour into 100 units)?
2. Why is it better to use the hour-method in estimating display-work than the measuring method?
3. How does estimator arrange so that each circular will eventually pay its share of rent, light, and heat for the printing shop?

UNIT VI

MATERIALS AND SPECIAL PROCESSES

JOB NO. 1.—THE MAKING OF PAPER
JOB NO. 2.—THE MAKING OF PAPER (*Continued*)
JOB NO. 3—THE MAKING OF PAPER (*Continued*)
JOB NO. 4—THE MAKING OF INK
JOB NO. 5—THE MAKING OF INK (*Continued*)
JOB NO. 6—THE MAKING OF TYPE
JOB NO. 7—THE MAKING OF TYPE (*Continued*)
JOB NO. 8—THE LINOTYPE
JOB NO. 9—THE LINOTYPE (*Continued*)
JOB NO. 10—THE MONOTYPE
JOB NO. 11—ELECTROTYPING
JOB NO. 12—ELECTROTYPING (*Continued*)
JOB NO. 13—STEREOTYPING

UNIT VI

MATERIALS AND SPECIAL PROCESSES

JOB NO. 1—THE MAKING OF PAPER

The Raw Material.—Paper is made from rags or wood. Rags are used for the better grades of paper, but some good papers are also made from wood. Sometimes the wood-pulp is mixed with the rag-pulp. In many respects the processes of making paper are the same for both kinds; but there are some distinctions. Therefore, the two processes will be taken up separately. The first is called the "rag-pulp process," and the other the "soda process of preparing wood-fiber."

The Rag-Pulp Process.—*The Rags.*—The rags are received at the mill in compressed bales weighing about 1,000 pounds each.

The Rag-Room.—The bales are opened, and the rags are sent to the rag-room, where they are sorted and prepared. Here buttons, hooks, rubber, and other superfluous material are removed, sewed seams are ripped, and the rags are sorted into different grades. (See Fig. 58.)

The Rag-Cutter.—The sorted rags from the rag-room are taken to the cutters, which very rapidly chop them into small pieces.

The Rag-Duster.—From the cutter the rags are carried automatically to the duster. The dusters consist of wire-covered drums, provided inside with blades to stir up the rags. The mesh of the wire is such that the dirt falls through, while the rags are retained. (See Fig. 59.)

The Bleach-Boiler.—After being dusted, the rags are put into a large revolving iron boiler of about five tons capacity. Here they are boiled under steam pressure with diluted alkali.



FIG. 58.—Sorting the Rags

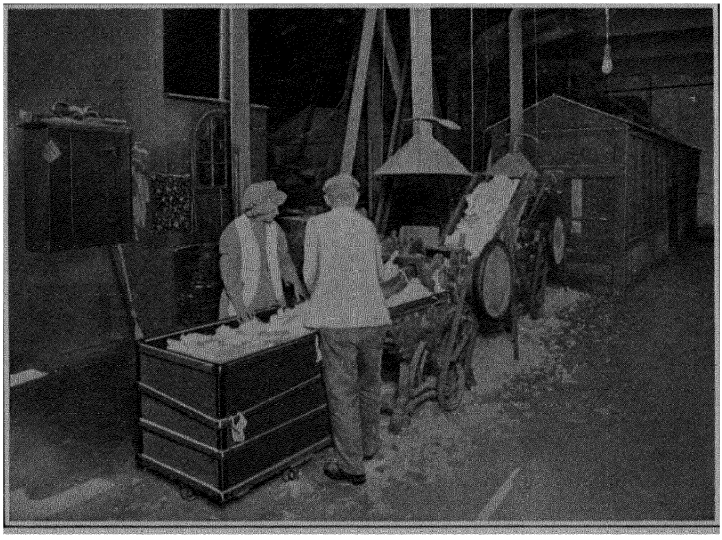


FIG. 59.—Shredding and Dusting

This treatment serves to take out the color and loosen the dirt and other impurities which may be present. The rags are cooled here for several hours. (See Fig. 60.)

The Washer.—When the boiling is finished, the steam and liquor are blown off and the rags are dumped from the slowly revolving rotary. From the bleach-boiler the rags are taken to the washer. This consists of an oval tub provided with a roll, which is equipped with blunt bars, or knives, set in the plane of its axis. These bars brush against a similar set of bars in the bottom of the tub. The dirt is separated from the fiber and is removed by running water, which flows into one

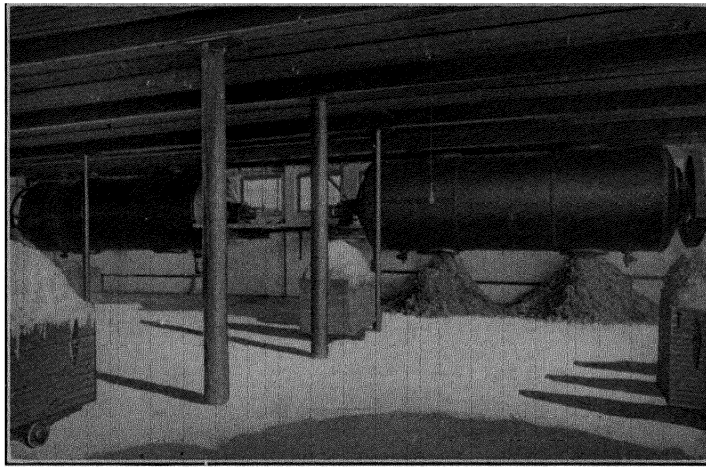


FIG. 60.—In the Bleach-Boilers

side of the washer, eliminating the dirt by means of the octagonal drum on the back side of the washer. After washing, the bleach is added.

The Drainers.—From the washer the rags containing the bleach are dropped into brick chambers, called "drainers." Here the pulp is allowed to drain until the water has been removed.

The Beaters.—From the drainers the stock is carried to the beater (Fig. 61). Here the rags are reduced to fiber, and these

fibers are cut and frayed by means of a roll and plate similar to those used in the washer. This beating, as it is called, varies

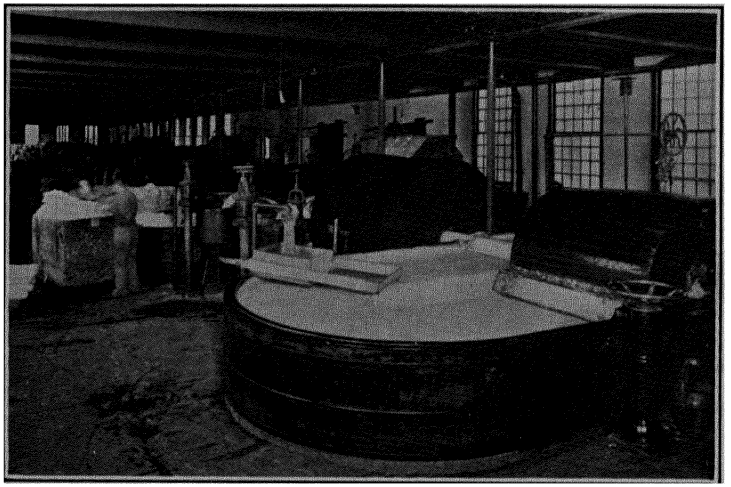


FIG. 61.—The Beaters

widely with different grades of paper, ranging from 18 to 24 hours or more. The resin size, alum, and color are added while the rags are in the beater.

Questions

1. What are the materials used in the making of paper?
2. What are the various processes in the making of rag-pulp?
3. What is the function of the bleach-boiler?

JOB NO. 2—THE MAKING OF PAPER (*Continued*)

The Soda-Process of Preparing Wood-Fiber.—Before completing the description of making paper by the rag-pulp process, the preparation of the fibers by the soda-process will be described. When the pulp has reached the stage where it is ready to enter the refining engine, preparatory to entering the paper-machine, the same treatment is given to the rag-pulp as is given to the soda-pulp Therefore, the latter part of paper-making may be taken up together for both processes.

Preparation of Raw Material.—The preparation of raw material for paper-making consists essentially in isolating the fibers from the other matter with which it is surrounded. The efficiency of the soda-process depends upon the solvent and saponifying power of alkali under high temperature, and any wood or plant may furnish the paper-maker with material.

Trees for the Preparation of the Pulp.—Different kinds of woods are used for the preparation of wood-pulp. In some parts of the country spruce trees are used. In southern Pennsylvania, poplar and gum are used far more than any other wood, and these are brought by water to the mills from the woods and farms of Maryland, Virginia, and the Carolinas. The bark is removed when the tree is cut and the wood is stored in the mill-yard until thoroughly dried.

The Chipper.—The first operation is to feed the logs to the chipper. This machine consists of a very heavy steel disc, 8 feet in diameter, set with three radial knives and provided with a trough, for the purpose of holding the log in such a position that the chips are cut off by the rapidly revolving knives with a slicing motion.

The Digester.—The chipped wood is fed to the digester, into which a charge of wood is put with a suitable amount of caustic soda. This is allowed to stay in the digester for several hours.

The Washing-Tank.—The contents of the digester are then blown into one of a series of washing-tanks, with false bottoms, where the cooking liquor is allowed to drain off and the pulp is subjected to a thorough washing. When the pulp first leaves the digester, it is a dark, rich brown color; after washing, it is a light grayish-brown, and is ready for screening.

The Screens.—At this point the pulp is diluted with a large amount of water to enable it to pass through the screens. The screens are so arranged that they allow the fine pulp to flow through the slots, while the coarse chips and dirt are retained on top of the plates and removed at intervals.

Wet-Machine.—In order to remove the excess of water as well as any trace of the spent cooking liquor that may remain, the pulp is then put through the wet-machine.

The Bleacher.—The tub of the bleacher is filled with wood-pulp from the wet-machine. Pure filtered water is added, together with chloride of lime solution, and the contents circulated and mixed for 4 to 6 hours. No beating takes place in this process, the entire preparation having been accomplished by the digester. At the conclusion of this operation the color of the pulp is a clear bright white.

Pulp-Drainers.—The pulp is now emptied, through large copper pipes, the drainers below, which are similar in construction to those used for rags. The pulp is allowed to drain until the water is removed.

Recovery of Caustic Soda.—A large factor in the manufacture of soda-pulp—in fact, the one element that enables the manufacturer to produce this valuable fiber at a cost low enough to permit of its liberal use in book-papers—lies in recovering the chemicals from the spent cooking liquor. This liquor is evaporated to drive off the water, and finally incinerated in a rotary furnace, by which means nearly all of the caustic soda used is recovered.

The Beater.—One of the most important operations in the manufacture of first-class paper is that of beating, by which the half-stuff becomes reduced to a finer state of division, and the fibers are put into such condition that they will interweave with each other on the moving wire of the paper-machine. Where there is to be a mixture of both kinds of pulps—the rag-pulp and soda-wood-pulp—they are put in here in the proper proportions. Sulphite pulp is also added to strengthen the paper.

Sulphite Pulp.—Sulphite pulp is made from coniferous wood grown in the northern United States, Canada and Scandinavia. The fiber is isolated by boiling in bisulphite of calcium and magnesium. Sulphite pulp gives the paper strength and color.

Sizing.—Clay and resin are also added at this point—clay to fill the pores and improve the printing surface, and sizing to prevent the absorption of printers' ink. At the same time, alum is added to precipitate the resin.

Conclusion of Preparation of Pulp.—This concludes the first part of the process in paper-making—the preparation of the pulp. Next comes the actual making of the paper; and both kinds of processes—the rag-pulp and soda-wood-pulp —are treated alike from here on—the second part of the making of paper.

Jordan or Refining Engine.—It is possible to complete the preparation of the fibers in the beating engine—as was the custom formerly—but in modern practice the pulp is pumped through a refining engine into a stuff chest, from which it is further pumped to the Fourdrinier machine (paper-making machine). In this machine it is possible to adjust the degree of fineness of the pulp.

Questions

1. What is meant by the soda-process of making pulp?
2. What kind of trees are usually used for the making of wood-pulp?
3. What are the processes in the preparation of soda-pulp?

JOB NO. 3—THE MAKING OF PAPER *(Continued)*

Fourdrinier Machine.—The Fourdrinier machine consists of the following parts: The wire, with dandy-roll, deckel-straps, and suction-boxes; the couch-rolls; the first press; the second press; the third press; the driers; the calenders; the reel; and the slitter. In this machine the paper is actually made. (See Fig. 62.)

Screens.—From the stuff-chest the pulp, which is now diluted with a large amount of water, flows through sand-settlers and regulating gates to the screens—which strain and purify the pulp.

Wire.—The strained and purified pulp flows over an apron into an endless traveling wire-cloth. The wire is supported perfectly level on a great many small rollers.

Dandy-Roll.—The dandy-roll, a light cylinder covered with wire, rests on the upper surface of the moist paper, giving it the impression of whatever design is on its surface. "Wove"

paper has both sides impressed with the fine woven wire. In "laid" paper the dandy is covered with parallel wire, with a cross-wire at intervals. Watermarks are impressed in the paper by superimposed designs of the face of the dandy-roll.

The Press-Rolls.—From the wire, the sheet of paper, yet scarcely able to bear its own weight, passes through several sets of rolls under heavy pressure, which serve to remove more water and to compact the sheet. From these, it passes over iron drums heated with steam. When leaving these, the paper is practically dry.

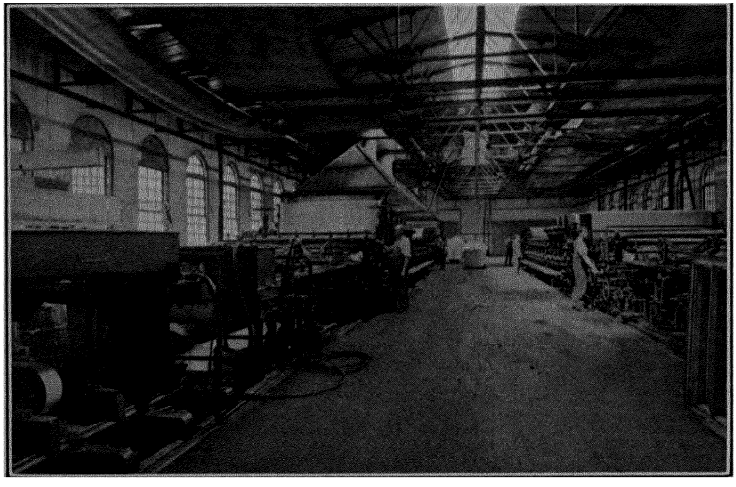


FIG. 62.—Paper-Making Machines

Paper-Machine—Dry End.—As the paper leaves the drying-rolls, it is cut into strips of the width desired and passed through a bath of animal size or glue. This size increases the rattle, hardness, and waterproofness of the sheet.

It is ready for shipment (if intended for printing from the roll), or for coating, or supercalendering, sheeting, and packing.

The Fourdrinier machine makes automatically an endless web of paper, from 60 to 100 inches wide, at a speed of 300 feet per minute.

Making of Sheet Paper.—*Supercalendering.*—Many grades of paper require a higher surface and smoother finish for finer printing and color-work; this is given by the supercalenders—a stack of heavy rolls, driven by power applied to the bottom roll only. The web of paper passes between alternate rolls of chilled iron and compressed paper under heavy pressure, which, combined with the slip between the rolls, levels and polishes the surface and makes it smooth and uniform. Sometimes, the paper is first cut into sheets before calendering or coating—as is the case at the American Writing Paper Company mills. But in many instances all that work is done before cutting the paper into sheets.

Coating.—Where a brilliant and durable paper is required, such as is demanded for fine catalogs and other matter of the best class, a coating is placed over the machine-finished paper, which must be sufficiently durable to withstand the hammering of the printing presses.

The coating process consists of the following operations: Mixing the color (the coating ingredients in liquid form), spreading it on the paper, calendering to smooth and level the surface, cutting into sheets (when coating is done from roll of paper), sorting to eliminate imperfect sheets, packing in cases for shipment.

Mixing the Color.—The first paper-coating was done with clay and glue. Today, a number of materials are used, consisting principally of clay, satin white, and blanc fixe, with casein (a product of skimmed milk) as an adhesive.

Coating Machine.—The coating machine, the function of which it is to apply and spread the color, consists of a drum over which the web of paper passes to an inclined endless rubber apron, which also acts as a bed against which the brushes may bear in order to spread and even the coating.

The coated sheet then passes to the drying gallery, where it is automatically looped upon sticks and carried the length of the room, where drying is accomplished by an ingenious method of air-circulation and heating.

The Loft.—At the American Writing Paper Company mill, where the drying is done after the paper has been cut into sheets, the wet paper is hung on poles in the drying loft. Here it is left for several days to dry and season, with freedom to contract or expand in all directions. For the highest grades of paper, no method of drying has been found which will give results equal to the old-fashioned loft. In the cheaper grade of paper, it is not possible to dry each sheet, as has been described. That would make the price for that grade of paper prohibitive.

Calendering.—Roll-paper is reeled and sent to the calenders, which are similar in operation and construction to the supercalenders, except that the rolls are filled with compressed cotton instead of compressed paper. The paper is taken from the loft and passed through the calendering rolls. The degree of smoothness given depends on the character of paper being made.

Finishing-Room.—All papers, whether machine-finish, supercalendered, or coated, are brought to the finishing-room, where the web of paper is cut into sheets. The revolving cutter can be adjusted to cut sheets of any length exactly true and square. Where the paper had already been cut, it is sent to be trimmed and made to conform to a proper size.

Inspecting.—The sheets are then laid in neat, even piles by a mechanical layboy, and are sent to the sorting-room in batches of 1 ton, to be inspected. Here each blemish is noticed and imperfect sheets are thrown out.

Counting and Packing.—The paper is then counted and packed in waterproof-lined cases, and is ready for shipment.

Sealing.—In the case of writing papers and other high-grade papers, it is usual, before packing the paper, to seal it in one-ream packages and also to label each package.

Questions

1. What is the Fourdrinier machine and what is its function?
2. How is the coating applied to paper?
3. What does the calendering process do to the paper?

JOB NO. 4—THE MAKING OF INK

There are several grades and kinds of inks, each used for a different purpose—some are slow-flowing and some are quick-flowing. A different grade of ink is used for the web-press, or rotary-press, from that used on the flat-bed cylinder-press. For halftone cuts the best grade of inks are used.

In the manufacture of inks, there are two main ingredients—the vehicle (oil) and the pigment (coloring matter). A drier is also used occasionally.

Ingredients.—*The Vehicle* (*Oils*).—There are several different kinds of oils used—and each grade, or kind, of oil is used for a specific kind of ink. Some of the oils used are linseed oil, semi-drying oils, Chinese wood oil, rosin oil, etc. Rosin, hard gums, and soaps are also used in the manufacture of inks.

Pigments.—There are several different kinds of pigments used. Each pigment has its particular purpose, and each produces a different kind of ink. Some of the pigments used are lamp-black, gas-black, bone-black, magnetic pigment, iron-blues, vermilion, chrome-yellow, chrome-green, ultramarine, coal-tar colors, red lakes, etc.

Drier.—Driers are particularly necessary with compositions that do not readily dry after use in printing. The oil must dry rapidly, yet not so rapidly that it will dry on the press before the impression is made. Some oils dry more rapidly than others. This is the case with linseed oil, which requires no addition of a drier.

The next thing to consider is how the ingredients which go into the manufacture of inks are derived.

Sources of Ingredients.—*Oils.*—The oil is first boiled. The rosin, or hard gum—whichever it is proposed to use—is broken into very small pieces and melted over a fire. When the mixture is homogeneous, it is added gradually to the hot oil, and the whole stirred thoroughly. This is then filtered through a cloth and allowed to stand, in order that the smaller particles of dirt, which may have gone through the cloth, may settle. After a few days the clear varnish is drawn from the sediment and is now ready for the addition of the pigment.

The Pigment.—The different pigments come from different sources, but their derivation is similar.

Lamp-black—the most important of all pigments—is produced by the burning of oils and fats with an insufficient supply of air for complete combustion. The soot formed is allowed to settle in large chambers, and is collected from time to time. For this burning, lamps are used, the construction of which is so controlled as to burn no more carbon than is necessary to keep up the combustion. The flame from the lamp strikes the cold metal surface and deposits its soot, which is afterward brushed off and collected.

Gas-black is made from the burning of gas with insufficient air for complete combustion.

Bone-black is made from charred bones, ground until a fine powder is secured.

The iron-blues are a mixture of the ferrocyanides and ferricyanides of iron and potassium. There are a number of blues made from these ingredients—bronze-blue, milory-blue, Chinese blue and Prussian blue.

Vermilion is the sulphide of mercury, a brilliant scarlet pigment.

Chrome-yellow is a mixture of the green oxide of chromium with a blue pigment.

The true ultramarine is the mineral lapis lazuli; but the commonly used pigment is made by heating together china clay, soda, sulphur, and charcoal.

The coal-tar colors are very numerous, and they cover almost every conceivable shade and color. As the name implies, they are made from coal-tar.

The red lakes are mostly of coal-tar origin, and are divided into three classes—derivatives of aniline, derivatives of naphthalene, derivatives of anthracene.

Questions

1. What is meant by a vehicle?
2. What three ingredients are necessary in the making of ink?
3. What is a pigment?

JOB NO. 5—THE MAKING OF INK *(Continued)*

Ink Manufacture.—The first step in ink manufacture is the preparation of the vehicle (the oil). Next comes the pigment. When the varnish, made by burning the oil and adding rosin or hard gum, is ready, the pigment (lamp-black or gas-black, or any other black or color) is added.

Mixing.—These are put in the mixer, or kneading machine (Fig. 63), and the two are thoroughly stirred together by means

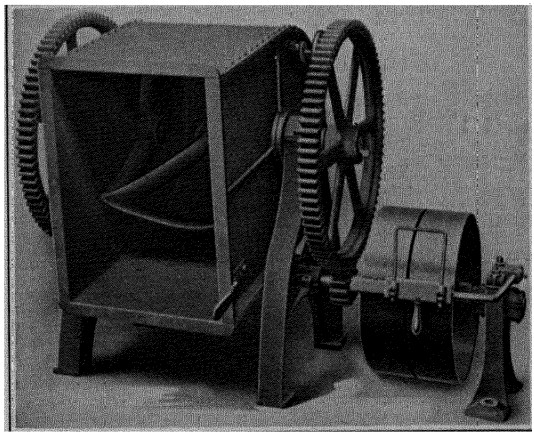


FIG. 63.—The Mixer

of flywheels. The mixer also eliminates the grit, and makes the mixture perfectly liquid.

This mixer, however, does not bring the particles of pigment into as intimate a mixture as is desired. Another machine is necessary for that.

Grinding.—Therefore, the mixture then goes to the grinder (Fig. 64), where it is ground between a series of three horizontal rolls, which revolve at different speeds—the rear roll slowest, the front roll fastest. The mixture is fed into the grinder between the rear and middle rolls, and is carried around by the middle to the front roll—where it is scraped off automatically.

This grinding is continued until the pigment is thoroughly incorporated with the oil.

The cheap inks are ground only once or twice, but the more expensive inks are usually ground many times—the best as many as seven times. The more the mixture is ground, the finer will be the ink. Too much grinding, however, will not be good. For halftone cuts, it is necessary that the ink be very fine; otherwise the result will not be good.

From the grinder the ink is collected into cans of various sizes—½-lb., 1-lb., 2-lb., 5-lb., 10-lb., etc. When these cans are filled they are closed, labeled, and prepared for shipment.

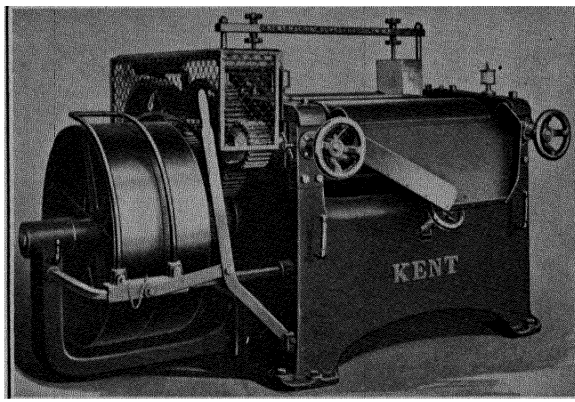


FIG. 64.—The Grinder

The Colored Pigments.—With some of the colored pigments another process is necessary before they are put in the mixer with the varnish. It is necessary to remove dirt or foreign substances which are contained in them in powdered form.

In order to remove these, the pigment is put in a large tank filled with water—one-fourth pigment in powdered form to three-fourths of water. In this tank, the pigment is stirred thoroughly with the water for many hours—possibly 24 or more. Then it is allowed to stand until the color settles on the bottom and the dirt remains in the water. The dirty water is then drawn off, clean water is pumped in, and the

stirring goes on again. With good inks, this process of cleaning may be repeated several times; with the cheaper grades, one washing is sufficient. The stirring is done by means of large flywheels, which revolve constantly within the tank.

In order to remove the moisture, the pigment is put in bags and placed on a press—where the moisture is squeezed out as far as possible; but this process still leaves a certain amount of moisture. Therefore, the pigment is then put in an oven, with just the right temperature, and is baked until most of the moisture is removed and it has become quite dry. After that, it is ready for the mixer, to be added to the varnish.

Ink Formulas.—Practice varies greatly with regard to formulas for inks, but it is possible to give a general idea as to their composition. Inks may be divided into four kinds—the most common types are:

Web-Press Inks.—For newspaper work, the vehicle is usually mineral oil, rosin oil, rosin, and soap. The pigment is usually a cheap lamp-black. For better grades of web-press work, linseed oil is used instead of mineral oil.

Flat-Bed Press Inks.—Linseed oil, rosin oil, and rosin are used for the vehicle, good lamp-black for the pigment.

Job Inks.—Linseed oil and hard gum are used for vehicle, good lamp-black or other black for pigment for black ink and colored pigments for colored inks.

Halftone Inks.—Good linseed varnish is used for the vehicle, gas-black for the pigment.

Questions

1. What are the various processes in the making of ink?
2. How is the colored pigment treated?
3. What is the effect of repeated grinding of the ink?

JOB NO. 6—THE MAKING OF TYPE

The Design on Paper.—Before a type-face can be made in metal, it must first be drawn on paper. The artist, working on Bristol board with india ink, designs each letter in accor-

dance with prearranged plans. When he has finished the drawings, he consults with the type-founder, who may have certain suggestions to make about altering or redrawing some of the letters.

Photography.—When the letters are made to suit and are accepted, the photographer makes enlarged negatives from the original designs. Prints are then made from the negatives.

Outlining the Characters.—*The Templet.*—After the prints are made, the type-founder's engraver uses tracing-paper to outline the photograph of each character on a piece of zinc—called "the templet."

The Stylus-Point.—The templet is set beneath the stylus-point of an upright pantagraph, and the workman guides the point over every detail of outline. As the stylus-point moves, a needle-point at the pantagraph's upper extremity moves in unison with it, engraving upon the face of a block of composition metal an exact replica of the drawing. This drawing on metal may be made in any size—from 6-point to 48-point, and larger or smaller.

Punch-Cutting.—The engraver slices away all that is not included in the outline, leaving the design in high relief. Punch-cutting, or pattern-making, in olden times was on steel and was done free-hand. Alexander Kay was the last of the old masters.

The Electrotype Battery.—The block of metal, on which the letter has been produced in high relief, is fitted into an oblong hole in a thin slab of copper. A dozen or more such combinations of slabs and punches, laid side by side, are fastened with beeswax composition into an arrangement called a "flask." The flask, suspended by wires in an electrotyping battery tank, receives upon each of the exposed faces a slow deposit of copper, which is precipitated from solution by electric decomposition of the fluid. This is called the "electrotyping process." (The American Typefounders Company now uses nickel instead of copper in this process.) The deposit requires about ten days on smaller sizes and about six weeks on larger sizes, to fill up every part.

When the flask leaves the tank, all the hollows have been filled with the metal (copper or nickel)—which has been put atom by atom into every interstice. The flask is then resolved into its separate parts.

Fitting-Bench.—The slab then goes to the fitting-bench, where it is to be made into a matrix. The matrix-fitter utilizes all his skill and all his delicate gages to develop and finish the matrix. Each matrix must have the same depth, to the minutest detail—from its upper surface to the bottom of its sunken face. Each matrix must be absolutely accurate.

The Type-Mold.—The type-mold is for the body of the type or character. This mold forms the whole body, but not the face (which is made by the matrix).

The type-mold is made from the finest grade of steel, and it must be absolutely accurate in every one of its twelve parts. While each matrix takes care of one letter, the type-mold takes care of the body of all the letters in the font.

The type-mold is made adjustable to different thicknesses. It will carry any matrix of its rightful size (the body for which it was made), and each must be locked in it in an unalterable relative position.

The type-mold is made in two sections—a right and left counterpart—with which the matrix is assembled as a removable attachment. When the two counterparts of the mold are finally united, their working faces, or inner sides, maintain a fixed distance—the mold's parts being immovable in any plane which can affect the body-size of the type which it will subsequently cast. Screws permit any amount of motion in the planes, which determine the thickness or the width of the type-faces.

At the upper edge of the mold is the opening, or seat, for the matrix slab, and the lower edge is open for the inrush of the molten type-metal—while the space between one edge and the other regulates the height of the type—0.9185 in.

When the mold goes into active service, it is locked, until the tiny aperture at one side is directly opposite the central part

of the matrix. Through that wee hole there is to be jetted a stream of molten alloy, which very swiftly hardens into type.

The mold must attain mathematical precision; and it takes about a week to complete a mold—which lasts only about three months of steady use, when it goes back to be rearranged.

Questions

1. How is a matrix made?
2. What is a type-mold?
3. How are the matrix and mold brought together for the casting of type?

JOB NO. 7—THE MAKING OF TYPE (*Continued*)

Type-Casting.—Before David Bruce perfected his type-casting machine, in 1845, types were cast by hand. Fitting the halves together, the caster took the mold in his left hand and poured molten alloy into the mouthpiece of the device. At this rate, the caster produced about 4,000 types a day. With the modern mold, in a hand-casting machine, 50,000 may be produced.

The Casting-Room.—When the mold and matrix are ready, the type enters upon its semi-final step—in the casting-room. The casting-room is divided into three sections:

Improved hand-casting machines which are used to cast larger job-faces—over 36-point type.

Steam-casting machines—which produce any face of type up to 36-point.

Automatic machines—casting large and small sizes, but used mainly for large faces.

Hand-Casting Machine.—The operator sets the mold with accompanying matrix into place, turns a wheel at the right of the machine, and there is forced through the melting-pot a plunger which drives the metal through a nipple, against which the mold's mouthpiece is resting. The jet pushes into the hollow mold and fills it. (See Fig. 65.)

Type-Finishing.—At the place where the mold's mouthpiece ends and the hollow begins, there is attached to the type a conical fragment of metal, called "the jet"—which is broken

off by boys—leaving the foot of the type almost flush, save for the slight projection of the break.

Then the type goes to the rubbers—workmen who rub each side of the letter against a circular stone, removing the bur from its edges and reducing it to a uniform smoothness.

The type next goes to the setter—who arranges the types, nicks all one way, on a wooden bar. Thereafter it goes to the dresser. He clamps the stickful in a steel rod, turns the

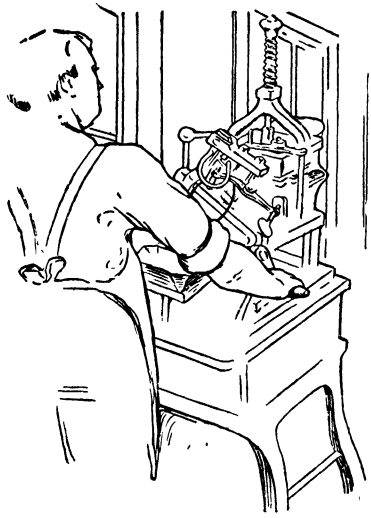


FIG. 65.—Hand-Casting Machine

face of the letters downward, and with a tiny plane grooves out a shallow depression, which makes the feet of the type.

The picker then inspects the types, picking out imperfect letters.

Then they go to the packing-room, to be put up into packages.

Kerning.—Besides the processes described, many characters in the popular job-types, and nearly all in script and italic faces, require another process—that of kerning. Kerning means cutting part of the type-metal away to allow other letters used with the type to come close enough to maintain

the regulation distance. The curve of the letter "f," for example, which projects beyond the edge of the body, is usually a kerned letter.

The Steam-Casting Machine.—The steam-casting machine is an expansion or amplification of the hand-casting machine. It operates more rapidly, but uses about the same principles. It breaks off the jet, not requiring the services of the boys to do that.

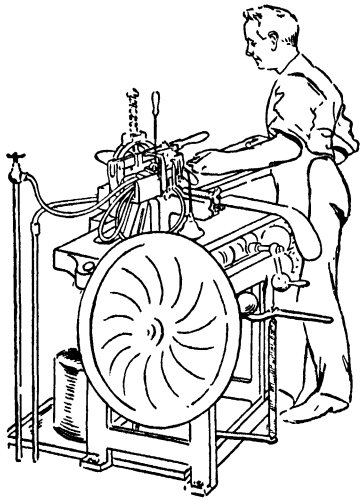


Fig. 66.—Automatic Casting Machine

The Automatic Casting Machine.—The automatic casting machine is one of the most up-to-date machines in existence. It casts the type, breaks off the jet, plows out the groove in the foot, removes the feather edges from the angles of each side, and delivers the type in serried rows upon sticks ready for the inspector—all in the same machine. The metal used on this machine is better than any other, because it is not possible to use such hard metal on any other machine. (See Fig. 66.)

The body-types made by the automatic machines are more accurate and uniform than can be made by any other machine.

Metal Used.—The alloy used for the making of type is a combination of various metals—lead, antimony, tin, and copper.

Questions

1. What are the processes of type-finishing?
2. What is kerning?
3. What are the differences in the three processes of hand-casting, steam-casting, and automatic casting?

The Linotype and the Monotype

The linotype is best adapted to newspaper work, ordinary book-work, magazine-work, and straight matter which is not complicated. For such work it is economical and time-saving. Where many corrections are to be used, however, it is expensive, because it is necessary to reset an entire line to make any correction in that line.

The monotype is best adapted to matter containing many figures, tabular matter, and other complex reading-matter, and also where many alterations are expected. It allows better results on the press and there is a better finish to monotype composition than to linotype composition. It is more expensive, however, because it requires two operations (as will be explained later); but the corrections are cheaper because they are made as in hand-composition.

JOB NO. 8—THE LINOTYPE[1]

The linotype has been in existence for over forty years, and it is now used in many of the printing-shops all over the world.

The linotype is not a type-setting machine. It is a type-casting machine. It composes matrices, or molds, which are assembled into lines—from which lines of type are cast. (See Fig. 67.)

[1] Based on booklet from the Mergenthaler Linotype Co.

The Magazine.—The magazine—which contains the matrices from which types are cast—represents the type-cases. In these are stored the molds from which the type is made.

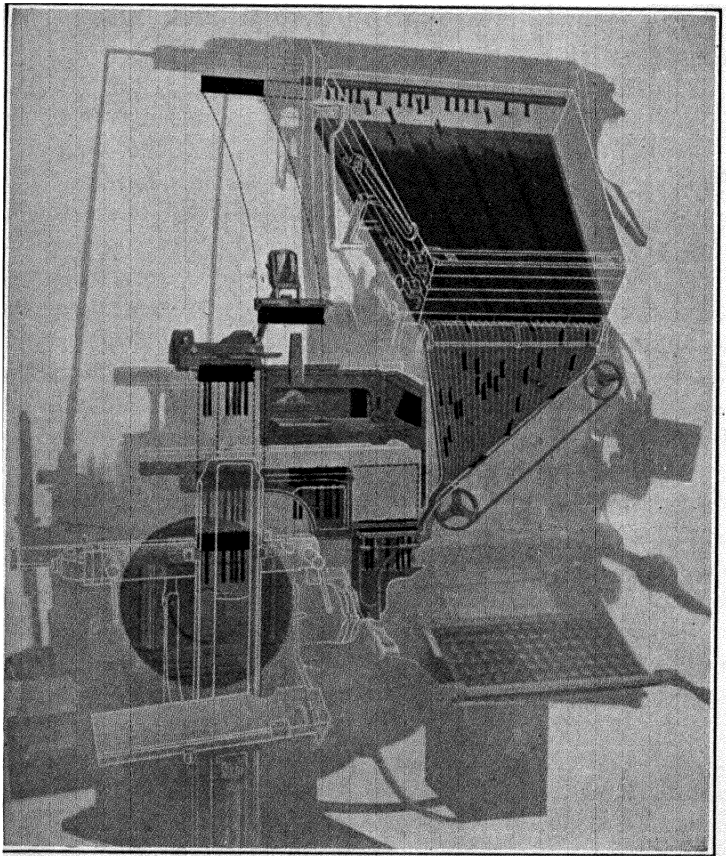


FIG. 67.—The Linotype Machine

Because every matrix circulates back to its place in the magazine as soon as it has served its purpose in a line of composition, a font of matrices need not be very large. It is small compared with a font of type. A magazine is, therefore, so light and compact that the operator can handle it without

exertion and can reproduce any variety of composition by simply changing magazines.

A change of magazines, which means a change of type, can be made on the linotype in 15 seconds. Either full-length or split magazines can be lifted off with very little effort, and other magazines can be placed in the operative position.

The Linotype Keyboard.—The keyboard, which is like that of a typewriter, controls the release of the matrices from the magazine. The operator touches the keys, representing letters or characters, in the order in which they are desired. The linotype operator, from his seat at the keyboard, has complete control of every function of the machine.

When the operator touches a key on the keyboard, the desired character is immediately released from the magazine, and travels down through the chutes of the machine.

The magazine easily releases the matrix representing the character wanted; and, when the matrix has served its purpose, it automatically circulates back to its place in the magazine —at the top of the machine. When the matrix is released, it drops through a chute upon a moving assembler belt and moves down into the "stick," or assembled elevator. A little star-shaped wheel of fiber pushes the matrices into a line and holds them upright.

The Matrix.—The matrix, or mold of letter or character, is a small piece of brass. On one side is the character indented into the matrix. It is from this that the raised character is cast on the edge of the linotype slug.

Setting the Matrices.—The linotype sets a number of these matrices into a row, or line. It then spaces that line automatically to the desired length. (See Fig. 68.)

Matrices with Two Characters.—On most linotype matrices, up to and including 14-point, there are two letters or characters; that is, they can do double duty; for instance, there may be a roman and an italic "k" or other letter on the same matrix.

To get either a roman or an italic letter, the operator presses the corresponding key on his keyboard. He determines whether a roman or italic letter will be cast by letting the

matrices ride on either one of the two rails, or tracks. If they assemble on the upper rail, the letters will be italic; if on the bottom rail, the letters will be roman. These rails are easily controlled by the operator—by pressing or pulling out a small lever.

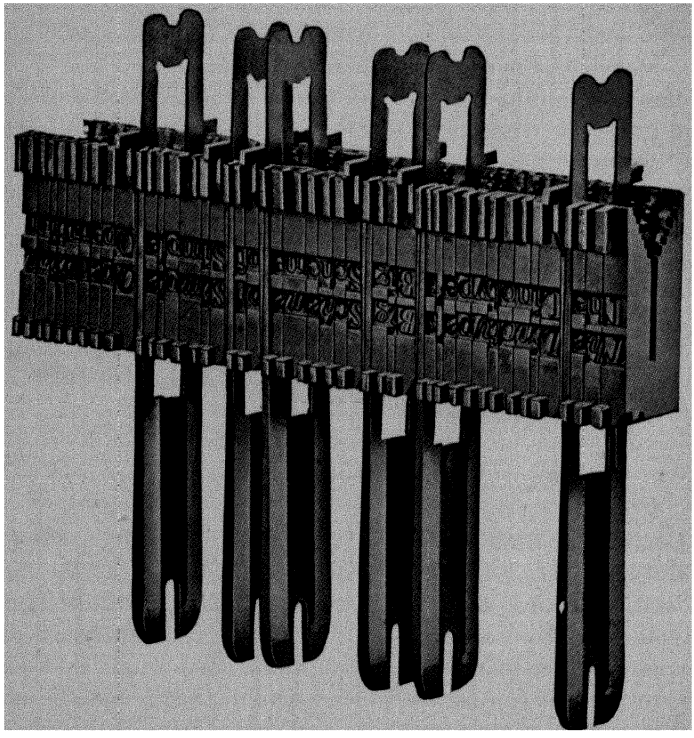


FIG. 68.—Matrices and Spacebands Assembled

Besides italic, the two-letter matrices are used to carry bold-face, small caps, and even a different face of type. Single letters, words, sections of lines, or entire lines may be set in bold-face, roman, italic, or small caps, at will.

The Linotype Spaceband.—The spaceband is used to make a space between two words. A touch from the operator releases it and drops it into proper place.

This spaceband consists of two wedge-shaped pieces of metal, which taper in opposite directions. When the operator has assembled a line of matrices and spacebands, he sends the line to the casting position. A bar rises and presses against the bottom of all spacebands in the line and automatically justifies the line to the proper length. This occurs because the upper part of each wedge is held firmly, while the lower part rises and widens the space as needed. (See Fig. 68.)

The Assembling Elevator.—The assembling elevator catches and holds the assembling matrices and spacebands until there is a line full of them. It serves much the same purpose as the printer's stick.

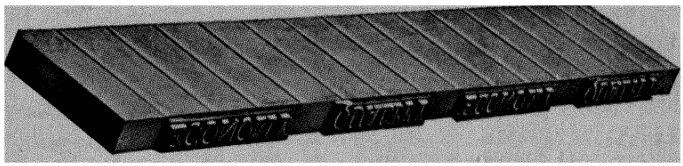


FIG. 69.—Linotype Slug

Casting the Line of Type.—When the line is full of matrices and spacebands, the operator depresses the lever at the right of the keyboard, which lifts the assembling elevator about 5-inches, from which position a "delivery slide" automatically carries the line to the left, on its way to be brought into position in front of the mold—so that a linotype slug may be cast.

The matrices face a mold in the disk and form the front of a slot, into which molten metal is forced. There are four such molds on the large revolving disk (mold disk).

It takes only an instant for the metal to be forced into the slot-like mold and into the characters in the matrices. The metal quickly cools, and a linotype slug has been made.

Linotype Slug.—The linotype slug is a bar of metal with raised type-characters on its printing edge. (See Fig. 69.) Six lines can be assembled, cast, and distributed on the lino-

type while one line would be set by hand. After the slug has served its purpose, it is melted again for future use.

Questions

1. What is a linotype magazine?
2. How is the linotype keyboard operated?
3. How is the linotype slug cast?

JOB NO. 9—THE LINOTYPE (*Continued*)

Display-Composition Slugs.—Extra large slugs, from 15 to 36 points, for display composition, are cast in a display-mold, which forms recesses in the slug, in order to make it lighter. Lighter slugs cool more quickly and permit speedier composition. These slugs are more conveniently handled, and less metal is tied up in storing them than if they were cast solid.

Slugs with Overhanging Characters.—Linotype slugs may be cast with an overhanging lip, which permits large characters to lap over one or more adjacent slugs. Slugs with overhanging characters are cast in the advertising figure mold.

Linotype-Slug Mold.—The linotype also produces space-slugs through the use of a slug-mold. These slugs are for the purpose of spacing. The range of the mold is from 5 to 14 points. In order to change the thickness or length of the slug, it is not necessary to remove the mold and put in another. The same mold produces different sizes and thicknesses with some simple manipulation.

Casting Rules and Borders.—In casting rules, borders, and decorative material, it is possible to use, instead of a number of matrices, a unified matrix slide-block, into which has been slipped a matrix-slide containing the desired design.

One matrix slide-block may be used for any number of different matrix-slides. After the slide is inserted in the block, the block is placed in casting position in the first elevator-jaw. As many slugs as desirable may be produced from one slide by recasting.

The Ejector.—After the slug is cast, it must be ejected. For this purpose there are blades, which the operator controls with

a handle, which he moves as occasion demands. In addition to ejecting the slug from its mold, these blades also push the slug through a pair of shaving-knives, which trim it true on the sides.

Galley for Accumulating Slugs.—The galley on which the finished slugs accumulate is in front of the first elevator, on the left-hand side of the machine. Every slug is in plain view, and can be transposed at will. When the galley is full, or the job is set, it can be lifted easily from the machine and the slugs slid off onto some other galley.

Distributing Mechanism.—After the slug has been cast, the matrices are ready to return to their original position in the magazine. The first elevator lifts them from the casting position and a slide pushes them to the right into the grasp of the second elevator. The second elevator then lifts them up to the channels at the top of the magazine, into which they are dropped by an ingenious distributing mechanism. The second elevator has a V-shaped bar with teeth on it. On these the teeth of the matrices engage, and they hold these until they are shoved into the distributor-box.

The Teeth of the Matrices.—The teeth in the V-shaped end of the matrices are arranged differently for different characters —like the teeth on Yale keys. The various teeth-combinations of matrix and bar make it possible for the matrices to find their proper magazine-channels automatically. When the matrix arrives at a point where the distributor-bar teeth which have been supporting it are all cut away, it drops into the magazine-channel from which it originally came.

The matrices are used over and over again, and are continuously distributed the same way.

Since the spacebands have no teeth, they cannot be held by the elevator. They are left on a track, and a metal finger from the right catches their tops and pulls them back to the right into their box. The second elevator comes down on an average of six times a minute to get a line of matrices.

Special Characters, or Sorts.—If the operator wishes to use special characters, or sorts—such as algebraic figures or frac-

tions—in such small quantities as to make the use of channels in a magazine undesirable, an automatic sorts-stacker at his right hand may be used. Such sorts are fitted with a tooth combination, which causes them to ride the entire length of the distributor-bar and drop off at the end of it into a flexible metal tube at the right of the machine.

Questions

1. How are rules and borders cast on the linotype?
2. How is the slug ejected after it is cast?
3. How does the distributing mechanism work?

JOB NO. 10—THE MONOTYPE

The Machine.—The monotype was invented by Tolbert Lanston. It produces single types, cast in the order in which they are to be used as well as set in justified lines. It consists, in reality, of two machines—a perforating machine with keyboard and a casting machine, both controlled by compressed air.

The Keyboard.—The are 276 keys on the keyboard (Fig. 70), including complete fonts of capitals, italics, bold-face figures, points, spaces, etc. These keys are arranged similarly to those on a typewriter; and provision is made for changing the mechanism of the keyboard to meet the requirements of special composition, but the keys are not changed for different classes of work.

The Operation.—With each stroke of a key a paper ribbon, about 4 inches wide, unwinding from one spool and rewinding on another, is perforated in such a way that it will control the matrix of the proper character in casting. A scale on the machine registers the body-width size of each character as its key is struck and charges this to the predetermined length of line, which has been indicated by an index. As the end of the line is approached, and the em-scale shows there is not room for the next word or syllable, another scale shows the number of spaces between words, which may be varied in size to justify the line properly, and indicates the keys the operator is to strike to produce this justification.

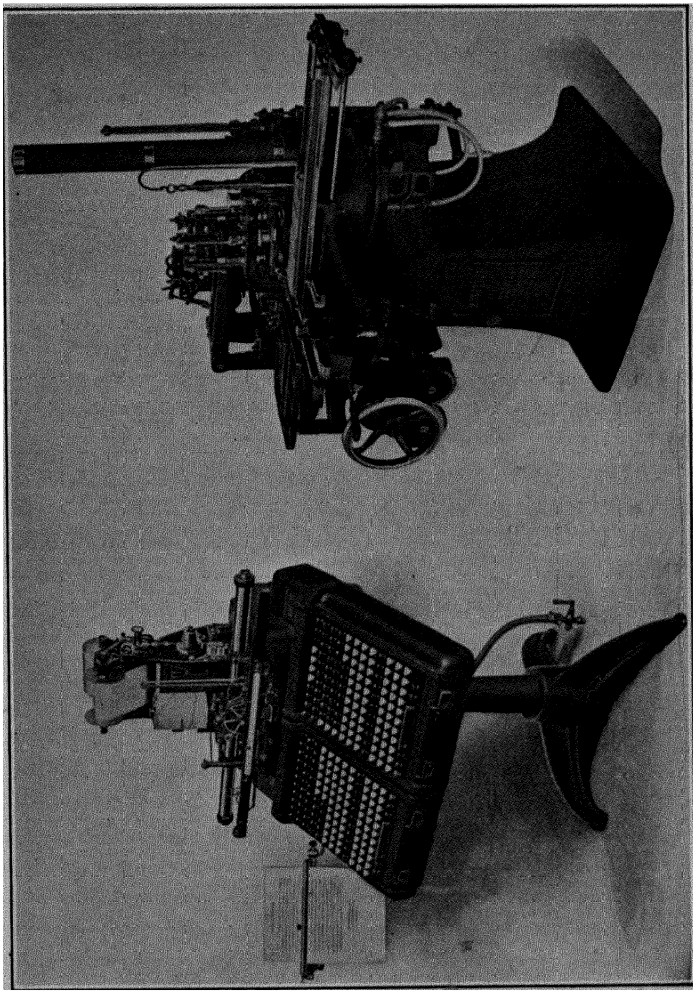


FIG. 70.—The Monotype Keyboard

FIG. 71.—The Monotype Caster

The perforated spool is then placed on the casting machine —unwinding itself, in casting, in reverse order; i.e., the last line perforated on the keyboard is the first one cast, the characters in the line being cast from right to left.

The Casting Mechanism.—The casting mechanism (Fig. 71) is controlled by air passing through the perforations in the paper as it runs over a rounded plate, resembling the tracker-board on a player-piano. While there are only 32 air-tubes and punches for making the perforations, combinations of the

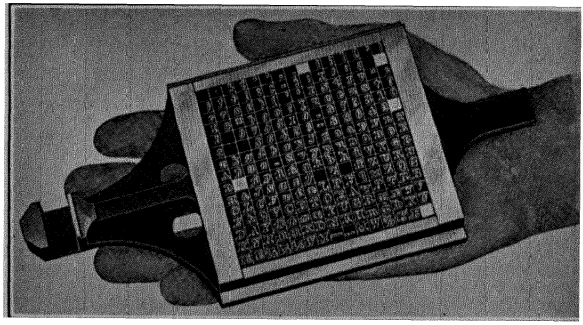


FIG. 72.—The Monotype Matrix-Case

perforations so manipulate the control mechanism as to shift the matrix-case, so that any one of the 225 characters it contains is brought to the mold at the instant the perforation or the combination passes over the tube-openings.

The hot metal is forced from the melting-pot, through a nozzle, to the mold and forced against the matrix of the character being cast, at the same time filling the mold for the body also. The metal is chilled instantly, and the completed type is ejected by the carrier into the line in the galley, the lines advancing automatically to make way for those which follow.

The substitution of one matrix-case (Fig. 72) for another in the casting machine requires only a few moments, and the molds, which cast the body of the types at the same time the face is cast in the matrix, can be changed quickly. All sizes, from 5-point up to and including 18-point, and any measure

up to 60 picas, are set in this manner, while larger sizes up to 36-point, and leads, quads, rules, borders, etc., for general use, are cast from individual matrices on the caster.

Changing Faces.—To change faces on the monotype, it is not necessary to change the keyboard if the new face to be used is the same size and the same point set as that which was previously used. The only change necessary is that of the matrix-case before casting the type. To change to a larger or smaller size, or to a different point set, it may be necessary to change the keyboard. This depends upon the kind of work called for by the change; and adjustment of the mechanism of the keyboard-machine will be required as well as a change of matrix-case on the casting machine.

Different Machines.—Besides the standard Monotype composition machine described here, there are two others for other uses—the type-and-rule caster, which does not set type, but which manufactures type of all sizes, and also makes leads, slugs, rules, and borders, in strips or cut to measure; and the monotype material-making machine, which does everything that the type-and-rule caster does, and which casts in separate pieces any leads, slugs, rules, and borders, from 6 to 15 picas, single-column leads, slugs, cut-off dashes, and rules with one or two corners attached. The last-named machine works at a high rate of speed—making ten 20-inch galleys of 6-point, single-column slugs in one hour. It is especially fitted for use in the newspaper composing-room.

Uses of Monotype Composition.—Monotype composition is used largely for the better class of catalog-, book-, and magazine-work, also in many newspaper offices for casting the display-type for advertisements. It is especially good for setting tabular matter in which rules are to be inserted, and many printers use the type cast by the monotype in their cases.

Questions

1. How is the keyboard of the monotype operated?
2. How is the monotype caster operated?
3. What is done when a change of type-face is desired on the monotype?

Electrotyping and Stereotyping

Electrotyping and stereotyping are methods of reproducing type-matter in facsimile. Where it is desirable to make an exact reproduction of any amount of type-matter, the process of electrotyping or stereotyping is resorted to.

Electrotyping means reproduction of type in ordinary metal, with the addition of copper on the face, for greater durability. Most electrotypes are copper-face; but, sometimes, nickel-face is used. Nickel-face has the advantage over copper-face in greater endurance—although it is more expensive. The nickel-face is also more useful for good work, because it gives greater clearness to the type-face.

Stereotyping means reproduction of type in ordinary metal —an alloy resembling type-metal. The combination of metals for stereotyping consists of lead, antimony, etc.

The Use of the Electrotype and Stereotype.—These processes are both time-savers and money-savers. In fact, it would not be possible to accomplish the work which is expected from the printing office without the use of plates.

A magazine having a circulation of a million or more per week could not possibly print all the impressions from one setting; but, when a number of reproductions of the pages are made, several presses are used at the same time for printing the same pages and a much greater quantity is thus printed at a given time.

JOB NO. 11—ELECTROTYPING

The electrotyping process was first originated by Jacoby of Petrograd, in 1840. Its practical application for printing purposes is due to Wilcox, of Boston, Mass.

The type-matter to be electrotyped, or plated (duplicated), is locked in a chase, and heavy bearers are put around it for good results in molding.

Molding.—The first act of the electrotyper is to mold the form, which is done in wax. The wax is melted in a kettle and poured in the molding case (a metal case wherein the

form is molded). The power molding press (hydraulic) is used for molding. It has a pressure gage and a depth gage—allowing the operator to see at a glance the amount of power applied. It is operated by a hand-lever. (See Fig. 73.)

The molding case and form are placed on the press; the bed slides under the machine; pressure is applied, then released;

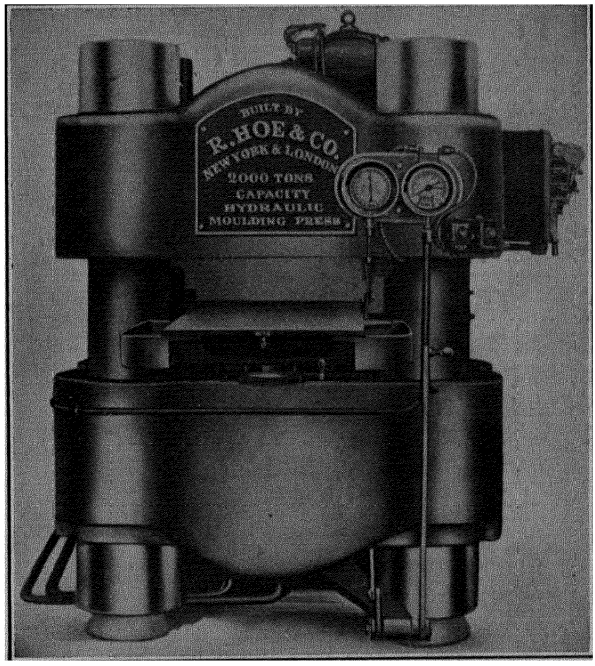


FIG. 73.—Hydraulic Molding Press

and the bed slides out again. A mold can be made in 20 or 30 seconds.

For lead-molding, the heaviest presses are used.

Building Up.—Next comes the building up of the form, which means cutting away the wax with knife in one part (where surface must be low) and adding with wax-stick to another (where surface must be high). Knife and wax-stick are heated.

Blackleading.—The object of blackleading is to put a coating on the wax-mold which will form a conductor to the electric current and secure the deposit of a shell of copper over every portion of the mold.

Blackleading is done by machine, and may be done in two ways—with dry blacklead or by the wet process.

Dry blackleading has some weak points—particularly, that of allowing the brushes to scrape against the surface of the mold. To overcome this, wet blackleading in now used generally.

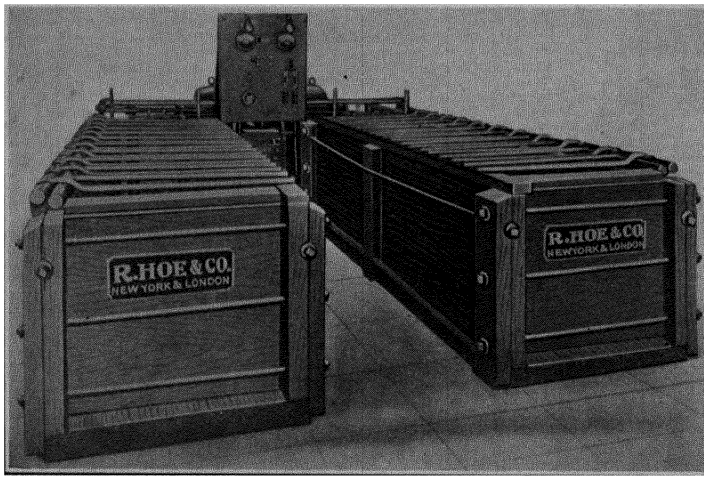


FIG. 74.—Electrotype Depositing Outfit

Wet blackleading is a mixture of graphite in water. The solution is forced against the mold by pressure.

The Battery.—There are two kinds of batteries—the galvanic battery and the dynamo. The old-fashioned galvanic battery is now rarely used. The dynamo is much more effective, quicker, and cheaper. (See Fig. 74.)

The Galvanic Battery is composed of a zinc plate and silver plate in an acidulated solution; the whole encased in a glass or porcelain container. The zinc is the positive pole, and the

silver is the negative pole of the battery. The copper anode is attached to the positive pole, the wax-mold to the negative. The copper will slowly deposit on the mold.

The Dynamo.—Depositing with a dynamo is a comparatively simple process. The depositing dynamo is a low-voltage machine, giving about 4 volts. The regular method of using depositing tanks is in a series of two. Under these circumstances, the dynamo could deposit 40 to 50 feet of shell, about $\frac{1}{250}$ inch thick, in about 3 hours.

The vat is either of slate or wood (usually wood). The solution of a copper bath consists of sulphuric acid, sulphate of copper, and water. The temperature of solution should be about 70 degrees.

The sulphate of copper does the depositing; the acid is merely to overcome the resistance of the electric current.

When a bath is once made, it is possible to use it for years, with a little attention.

The anode (which is merely a piece of copper) and the cathode (which is the wax impression, backed by metal) are hung on cross-rods and are dipped into the solution. The cathode is usually placed in the bath opposite the anode, about 2 inches apart. In addition, there is a little flat piece of metal sunk into the wax for an electrical connection (since wax is a non-conducting material).

Agitation.—Better results may be had when the solution is in an agitated condition. This is accomplished by means of a machine (an air-pump), which keeps the solution in a continual state of turmoil. This is for the purpose of keeping the solution uniform and preventing the copper from settling on the bottom of the vat.

After the shell is deposited, the wax-case is removed and the shell and wax are separated. This is done by heating. The shell is now ready for backing (that is, filling the back with metal).

Metal Furnace.—Gas or coal may be used to heat the metal used for backing; but gas is preferable.

Composition of Metal.—The composition of the metal used for backing is as follows:

	Per Cent
Lead	90
Tin	5
Antimony	5

Pouring the Cast.—After the shell is removed and cleaned of wax, it is placed face down in a backing-pan (which supports the shell), and the back of the shell is thoroughly cleaned with a solution of water, muriatic acid, and zinc. After the acid has been applied, strips of tinfoil are laid upon the back of the shell. Since the backing-pan is hot, the tinfoil will melt at once. This tinfoil is used as a means of fastening the backing metal to the shell.

As soon as the tinfoil is melted the backing metal is poured on. When the pan is filled with metal, it is left to cool. After it is cooled, it is necessary to clean it, and it is then ready for finishing and blocking.

Questions

1. What is meant by "blackleading?"
2. What is the difference between the galvanic battery and the dynamo?
3. What is the advantage of agitation in the solution?

JOB NO. 12—ELECTROTYPING *(Continued)*

Finishing the Plate.—*Straightening.*—The first operation is to flatten the plate, remove nicks and dents, and make the surface even.

Roughing Off Back of Plate.—The plate is then given a cut on the rougher, which brings it down to a good working thickness for the finisher, and eliminates all roughnesses on the back of the plate.

Finishing.—For the location of low spots, a rubber is used, which brightens up all high spots; low spots remain dull—not being reached by the rubber. A pair of calipers is then used; the lower part is held to the under side of the plate, while the upper point is held some little distance above the copper surface.

The upper point is moved around the edges of the low spot, which causes the point on the lower jaw of the calipers to

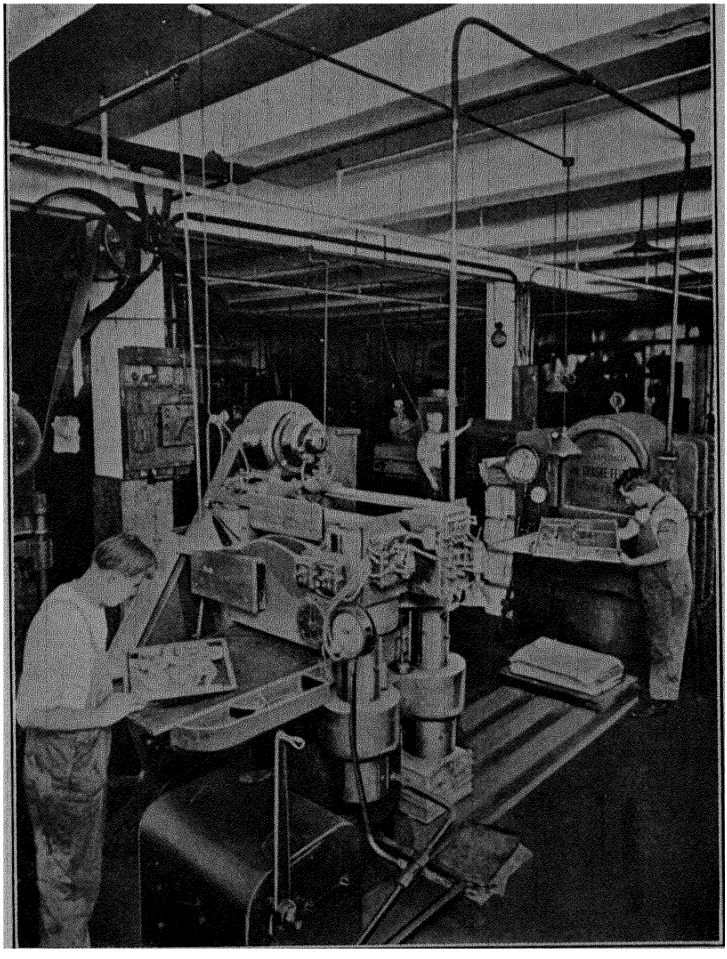


FIG. 75.—Molding

scratch the metal of the back of the plate—locating upon the back the low spot on the surface. The low spot is then beaten up from the back until the surface is even.

Shaving the Plate.—When the plate has been made of even surface, it is taken to the shaver, and there it is shaved to the required thickness—which is 11 points.

Curved Plates.—For certain kinds of printing presses the electrotype is fastened around the cylinder. Therefore, this type of plate, after it is shaved down, is curved to fit the cylinder. This is done on a curving machine.

Blocking and Mounting.—*Mounting on Wood.*—Where plates are to be mounted on wood, they are placed on a base that will make them the same height as the type. They are then nailed on the base.

Mounting on Metal.—Metal blocks are rarely made solid, because of their great weight. These bases are cast in a special mold; and, when the mold is ready, the plate is attached by means of nails; or it may be sweated on (with tinfoil).

Plates for Patent Blocks.—Where plates are to be used for patent blocks, the plate is beveled along the edges and is not mounted, since the plate, placed on the patent block in the chase (or form), will make it type-high.

Trimming.—It is necessary to make the plate or cut even on the sides. A saw is used to trim the cut to the exact area required and make the sides even.

Facings Other Than Copper.—Besides copper, nickel, steel, and brass are used to face plates; but steel and brass are used rarely.

The reason for using nickel is to get a harder and more durable surface and also because certain inks (those containing mercury—like red inks) affect a copper surface and make it corrode on a long run.

Because of the ease with which a copper shell can be started upon the wax, and the difficulty of depositing other metals upon a plain wax surface, most metal facings, other than copper, are given a start with copper and are transferred to the other bath later.

Nickel Bath.—To make up a nickel bath, the double sulphate of nickel and ammonia are dissolved in warm water in the proportion of 12 ounces to a gallon of water, adding 8 to 10

per cent of common salt (which increases conductivity and helps deposition). The handling of the nickel bath is otherwise the same as in the case of the copper bath.

Iron or Steel Bath.—Here the double sulphate of iron and ammonia is dissolved in water in the proportion of 2 pounds to 1 gallon of water.

Brass Bath.—The composition of a brass bath is as follows: 16 ounces of cyanide of potassium, 5 ounces of carbonate copper, 1½ ounces of carbonate of zinc, 1 ounce of ammonia, 1 gallon of water.

Questions

1. What are the processes in finishing an electrotype plate?
2. When are curved plates used?
3. What advantage is there in the use of a nickel-face plate?

JOB NO. 13—STEREOTYPING

The stereotype is for the cheaper grades of work. It is used quite extensively for newspaper work.

The Matrix-Rolling Machine.—The page of newpaper—after it is made up and properly tightened in a form—is sent to the matrix-rolling machine. (See Fig. 76.)

Matrix.—Papier-mâché (a number of sheets of tissue-paper and blotting-paper pasted together) is used for the making of the matrix. This papier-mâché is put over the page of type, and the form with the paper over it goes through the matrix-rolling machine, where an impression is made.

Steam-Drying Press.—After the impression is made, the form with the matrix still on top of it is slid into a pneumatically operated steam-drying press, which dries the matrix, while still maintaining the pressure between it and the form. The matrix, after it has dried and hardened, receives a coating of a chemical, which prevents the liquid metal from sticking to the matrix.

The Cast.—The matrix is then placed in a casting mold, where metal is poured over the face of it—forming an exact reproduction of the type-matter.

Two kinds of plates may be made from the matrix—the straight and the curved plate.

The straight plate is used for flat-bed presses—presses which print from single sheets of paper. The casting here is done from a flat mold.

The curved plate is used for the rotary-presses, or web-presses—presses which print from rolls of paper. On these

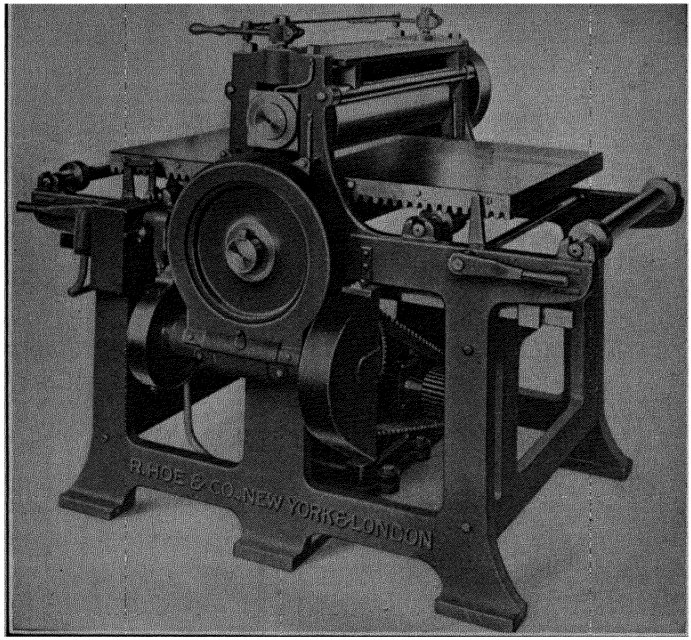


FIG. 76.—Matrix-Rolling Machine

presses the plates are attached to the round cylinders, and therefore they have to be curved. For newspaper plates, which have to be curved, the curved casting-mold is used.

Finishing.—The next stage of the process involves trimming the plate on the ends and shaving. There are separate machines for the trimming and shaving operations. In large

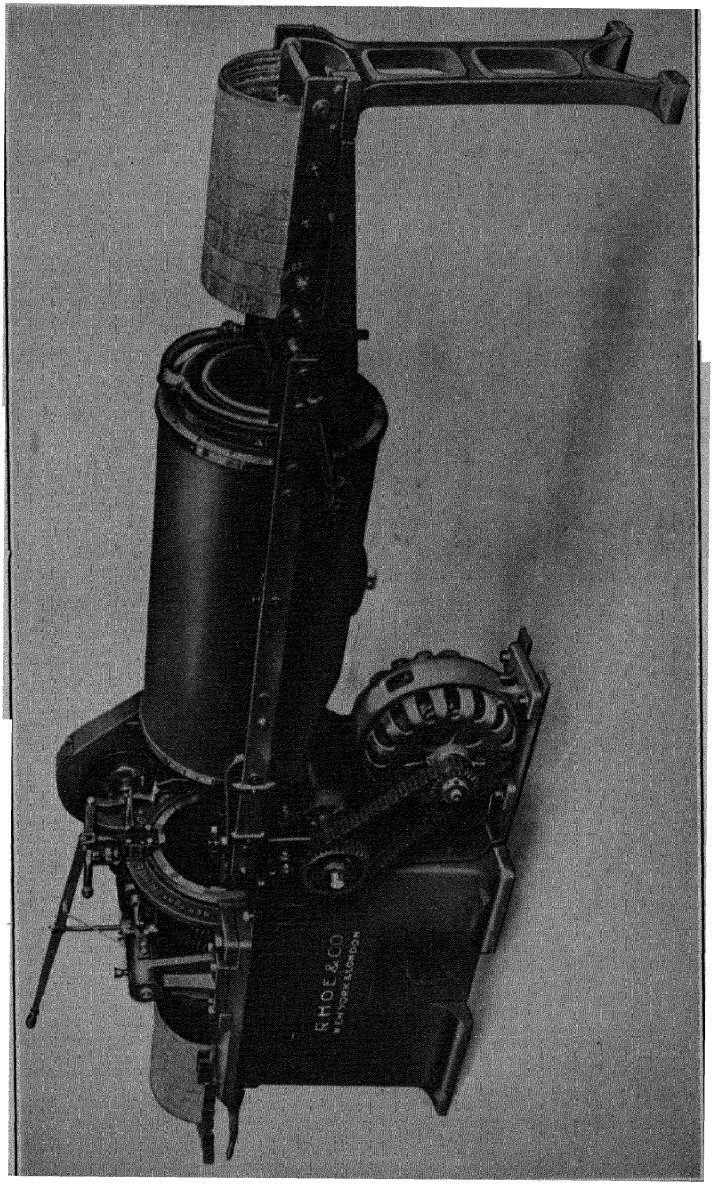


FIG. 77.—Curved Stereotype Plate-Finishing Machine

newspaper offices, where speed is essential, a combination finishing, cooling, and drying machine is employed. This machine does everything necessary for the finishing of the plate. (See Fig. 77.)

The Uses of the Stereotype.—Stereotyping is rarely used for good job-work or book-work. It is confined to the cheaper grades of commercial work and book-work, where the matter of durability is of little consequence.

In newspaper work, stereotyping plays a very important rôle, as practically all the duplicating work there is done by means of stereotypes.

But the newspaper publishers usually have their own stereotyping departments—which naturally excludes the stereotyper from securing that kind of work.

Questions

1. How is the matrix for a stereotype prepared?
2. How is the stereotype cast?
3. What are the uses for the stereotype plate?

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