PROCESS AND PROJECT SHEETS FOR A ONE-YEAR COURSE IN GRAPHIC ARTS IN HIGH SCHOOL

by

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in partial fulfillment of
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Director of Thesis  Date
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CHAPTER I

INTRODUCTION

History of the Graphic Arts

"And this our noble art of Printing is the very foster mother of all learning; for although the few had books before John Gutenberg gave us our art, not until Printing came could Learning, yea and Wisdom also, knock at every man's door."

From the Latin of Cordelius, 1546.

The Development of the Alphabet: When man erected the first pile of stones to record an important event, the Graphic Arts were born. This event took place many thousands of years ago and since that time all primitive peoples have, in one way or another, attempted to record their important historical events.

The earliest known efforts of man in the Graphic Arts field are found on the walls of caves in the foothills of the Pyrenees\(^1\) depicting such animals as horses, bison and mammoths, and the hunting activities of man. Since that time man has used such things as knots in rope, calendar sticks, painted shafts, petroglyphs, clay tablets, and painting on animal hides to record events.

With the development of the cuneiform characters by the Chaldeans\(^2\) about 6,000 B.C., the beginning of the

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development of the present alphabet, as we know it, was under way. The Egyptians followed with a form of picture writing or symbols called hieroglyphics, about 5500-4000 B.C. It remained for the Phoenicians to devise a simple set of phonetic characters.

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![FIGURE I. TABLE SHOWING DERIVATIONS OF THE LETTERS, AND A FEW CHARACTERISTIC STYLES OF LETTERING]

"No doubt, the symbols of the Egyptians, Chaldeans, and others, had a direct bearing on the development of the alphabet but it remained for the Phenicians to simplify the existing signs and to assign to each character a definite phonetic value. It is for this reason that the Phenicians are credited with the invention of letters."

The alphabet arrived at its present status through a number of stages. The Greeks took fifteen of the original twenty-two characters of the Phoenician alphabet and added nine characters of their own to meet their needs. The Romans adopted eighteen of the Greek letters and added seven letters, some only slightly modified in form. The Anglo-Saxons took all the Roman alphabet and added two new letters, but later dropped one. Through these stages and about 8,000 years of time our present alphabet evolved.

Thus, we note that aside from the three basic needs of man—food, shelter and clothing—the communicative or Graphic Arts were the earliest form of art to develop.

The Development of Paper: With the development of an alphabet it of necessity followed that a suitable medium be developed on which to write. The Egyptians made this important contribution by manufacturing a writing surface from papyrus, a tall reed growing along the Nile. From this start we retain the word paper as applied to our present day writing and printing surfaces. Small strips of papyrus were woven together in an under-over fashion.

After being soaked in water and pressed and dried, a sheet suitable for brush writing was the result. The earliest known papyrus rolls were recently discovered in an Egyptian mummy case dating about 3500 B.C.

Paper as we know it today, made from and matted in a solid sheet, was invented by the Chinese in 105 A.D. The secret was well guarded as the art of paper making did not reach Bagdad until 793, and Egypt in 900. It was not until 1150 that the process of paper making was introduced into Spain. Paper reached Italy in 1270, Germany in 1390, England in 1494 and, finally, it was manufactured for the first time in Philadelphia in 1690.

In Europe the writing surface developed from imported papyrus to parchment, to vellum, to rag paper as made by the Chinese and more recently to woodpulp paper. The writing instrument developed from the crude brush to the quill pen, to the steel point, and, finally, to the modern fountain pen.

**The Development of the Book:** As the alphabet, writing instrument, and writing surface developed, so did the form of the manuscript. This first appeared in the form of individual sheets tied together in bundles. The next step was a roll. The Hebrews devised the scroll which was unrolled as read and rerolled as finished.

It remained for the Jurists of the late Roman Empire

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and the early Medieval Church to develop the present book form about the fourth century A.D. Although the old roll was called a *volumen* as associated with the literary works of the pagan culture, and much of the writings of the Christians were presented in the codex form, it is interesting to note that the word volume survived in wider use, while the word codex or code is used only in a specialized meaning.⁶

**The Invention of Printing:** With the development of the alphabet, writing ink, and writing surface to a high degree of efficiency, the time was ripe for the invention of movable type.

The first book printed from movable type was the Gutenberg ⁴₂-line Bible. This event was recorded August 24, 1456, by the vicar of St. Stephen's Church at Mainz, Germany, when he entered in the front of that Bible, now in the Bibliothèque Nationale at Paris, the fact that the rubrication and binding were finished. He expressed pride and satisfaction at the completion of the two fine volumes.⁷

The ⁴₂-line Bible required 1,200 pages and two volumes to complete the work. Although the first known date of issuance was 1456, historians and research workers have set 1439 as the date of the invention of movable type by John Gutenberg, of Mainz, Germany. While work was

proceeding on an undertaking of such magnitude, printing two pages at a time and only 42-lines to the page, it was necessary for Gutenberg to do other smaller pieces of printing to finance his major enterprise. This accounts for the
lapse of seventeen years between the time of the invention of movable type and the completion of the Bible. The first piece of dated printing was the astronomical calendar for 1448.

At first printing met with opposition from the rubricators, and also because of the prejudices and superstitions of some of the people. But after the first opposition, the art of printing spread rapidly throughout the then known world. It arrived in Italy in 1464, England in 1472, Mexico City in 1536, and was introduced into the colonies by Stephen Daye in 1639.

FIGURE III. FRANKLIN, THE PRINTER
BY CHARLES E. MILLE

Although several printers had come and gone before Benjamin Franklin was born in 1706, he is considered today as the patron saint of American printers. Besides his many achievements in public life, Franklin did much to inspire printers throughout the colonies and to put the industry on an improved basis. Two of his most noteworthy publishing ventures were the Pennsylvania Gazette, now the Saturday Evening Post, and Poor Richard's Almanac. Although he rightfully could have signed himself scientist, author, philosopher, or statesman, he preferred to sign himself Benjamin Franklin, Printer. Probably one of the most widely quoted epitaphs ever written was that written by Franklin:

The Body
of
Benjamin Franklin
Printer
(like the cover of an old book,
it's contents torn out,
and stripped of its lettering and gilding,)
lies here, food for worms,
But the work shall not be lost,
For it will (as he believed) appear once more,
in a new and more elegant edition
Revised and corrected
by
The Author

Until the past century printing was still expensive and limited to the rich and middle classes, but with the development of light speed presses and the Fourdrinier paper-making machine, the stage was set for printing which would be within the reach of every person—save for one drawback, and

that, the cost of the slow and laborious process of setting type by hand. This problem was solved in 1880 by a Baltimore watchmaker, who seeing printers working long hours in poorly lighted and ventilated composing rooms, made the observation that there must be a more efficient way of setting type. The result was the first successful linotype machine which he completed in 1884. As a result of the combination of these printing improvements through the century, it is now possible at comparatively low prices to record scientific and informational materials for educational purposes. Business has printed materials neverbefore dreamed of to facilitate its workings, and where the average home had but few books and usually one publication, now every home has access to many books and numerous periodicals.

"Blest Invention, to God alone the praise! For gifting man this noble art to raise; The want of thee kept arts and commerce low, Without thy aid, how little could we know? Thou art the means by which we gain redress, Our Nation's bulwark is the Printing Press." J. Johnson, 1818.

Place in the School Curriculum

"The glory and power of printing is not all in the past. Its influence in the present makes it a powerful conservator of human progress. It is the handmaiden of all the arts and industries, and a most effective worker in the world's workshop, to polish and refine the civilization of the age."

Carlyle

The place of the industrial arts program in the secondary schools is already well known. The fact that the
graphic arts is one of the four major divisions of the industrial arts field, automatically establishes its place in the curriculum. Therefore, little time and space need be taken here to restate this all-too-well-known fact.

It is interesting to note that some authorities even go so far as to advocate that it be raised from an elective to the status of a required academic subject:

"Printing Education should be a basic academic subject for every junior and senior high school student. Not for purely exploratory or guidance reasons, nor because every student is a potential printing craftsman, but because the student's success or failure, the extent of his culture, learning and the range of knowledge, depend upon the facts and theories recorded upon the printed page. Printing and education are twins."11

The importance of the printing and publishing industry is seen when we note that:

"On the comparison of number of establishments in manufacturing industries, 1925 to 1936 inclusive, it is shown that printing and publishing stands first in three of the six years considered and second in the other three years."12

These facts were taken from the National Census of Manufacturers of 1939 as published in 1940, and included ten of the nation's leading industries. This report also shows that the printing, publishing and allied industries stand first in the number of salaried employees, and that

for every salaried employee there are 2.6 wage earners.

"The 1940 directory issue of the National Graphic Arts Educational Association lists more than 3,000 teachers of printing and 2,500 schools having departments of printing."\(^{13}\)

It might be well here to restate the summary of objectives set forth by the American Vocational Association:\(^{14}\)

1. To develop in each pupil an active interest in industrial life and in the methods of production and distribution.

2. To develop in each pupil the ability to select wisely, care for, and use properly the things he buys or uses.

3. To develop in each pupil an appreciation of good workmanship and good design.

4. To develop in each pupil an attitude of pride or interest in his ability to do useful things.

5. To develop in each pupil a feeling of self-reliance and confidence in his ability to deal with people and to care for himself in an unusual or unfamiliar situation.

6. To develop in each pupil the habit of self-discipline which requires one to do a thing when it should be done, whether it is a pleasant task or not.

7. To develop in each pupil the habit of an orderly method of procedure in the performance of any task.

8. To develop in each pupil the habit of careful, thoughtful work without loitering or wasting time (industry).

\(^{13}\) Wake, Selmer O. *op. cit.*, p. 25.

9. To develop in each pupil an attitude of readiness to assist others when they need help and to join in group undertakings (cooperation).

10. To develop in each pupil a thoughtful attitude in the matter of making things easy and pleasant for others.

11. To develop in each pupil a knowledge and understanding of mechanical drawing, the interpretation of the conventions in drawings and working diagrams, and the ability to express his ideas by means of a drawing.

12. To develop in each pupil elementary skills in the use of the more common tools and machines in modifying and handling materials, and an understanding of some of the more common construction problems.

Aims of the Course

"I have considered that among artisans good apprentices are most likely to make good citizens."

Franklin.

The aims of a graphic arts course as set up on an industrial arts basis for secondary schools may be divided into three general divisions, but these in turn may be broken down further into many minor objectives. These divisions are: (1) General educational, (2) Avocational, (3) Vocational.

General Educational: It is of general educational value because:

1. It deals with an art which the average student daily associates with in the form of books, magazines, newspapers, and various printed materials, and yet is one of the arts which he knows the least about.

2. Its historical background is the story of the development of universal knowledge.
The Seven Cardinal Aims of Secondary Education
As Attained Through The Industrial Arts—Graphic Arts Laboratory

This chart is a graphic illustration interpreting the educational and social values of the printing, or graphic arts activity in terms of the Seven Cardinal Aims of Education as adopted by the National Education Association.

The general acceptance of the "Learn by Doing" concept of education represents a trend toward a more practical form of education—which conforms to positive workaday needs to enable youth efficiently to adjust itself to the world in which it must live and work—and lends additional emphasis to the educational values of the "Seven Cardinal Aims."

The Graphic Arts activity on the Industrial Arts level is the ideal medium through which the Seven Cardinal Aims of Education may be given real living values.

In the preparation of this chart an attempt has been made to illustrate how and why the Graphic Arts Laboratory serves as the core through which the entire school program is given interest and vitality.

FIGURE IV. PRINTING IS A VITAL FORCE IN THE FIELD OF MODERN EDUCATION 19

15. Graphic Arts, the Foundation of a Liberal Education, op. cit., p. 9.
3. Its value in the consumer educational field will be of value to every student throughout life as there are none who will not be potential buyers and users of graphic arts materials.

4. Graphic arts, being a basic communicative art, is a basic element in all the arts and sciences.

5. It is of value for its self-exploratory values.

Figure IV graphically illustrates how the graphic arts program meets the objectives of secondary education. Although the author has used the term "Seven Cardinal Aims of Secondary Education" instead of the proper term "Main Objectives of Secondary Education," the chart will be used here because of its clarity and illustrative value.

**Avocational**: In these days of increasing leisure time it is becoming even more imperative that the public schools develop desirable avocational activities.

A well-rounded course in the graphic arts field may lead to the following avocational activities:

1. Book and magazine binding.
2. Personalized Christmas and greeting cards.
3. Personalized stationery, book plates, etc.
4. Interest in amateur journalism.
5. Silk screen and linoleum block printing.
7. Collecting of old prints and books.
8. Taking pictures.
9. Developing, printing, enlarging and tinting pictures.

Vocational:

1. Vocational guidance should be negative as well as positive. How much better for a student to spend one hour a day for a school year to find that he does not wish to be a printer, or that he is not suited to be a printer, than to spend six months or a year of his life in industry to find out the same thing.

2. It is important, once a student has found out he wishes to enter the graphic arts field, that he explore further and find out which one of the twenty-four specialized divisions he is best suited to enter.

3. Once he has decided on the branch in which he wishes to specialize, then it is important that he take as much work in that field as possible and also be guided into those related courses which will give him the widest training.

Survey of Materials in the Field

"Lo! here the form and figures of the press
Most lively object to thine eye,
The worth whereof no tongue can well express—
So much it doth, and works so readily;
For which let's give unto the Lord all praise,
That thus hath blessed us, in these latter days."
Peter Dorbell, 1543.

Before proceeding with the analysis and organization of lessons dealing with the effective teaching and learning of printing, it will be profitable to examine and evaluate various textbooks, teaching aids, and learning materials prepared for use in this field. Obviously, if satisfactory textbooks and workbooks are available, there would be little value in attempting to formulate and develop lessons of one's own. The most promising materials in this field are briefly summarized and evaluated in the pages which follow.
Professional Training Program for the Graphic Arts Industry, Selmer O. Wake, 1947: A survey of 500 West Coast printing employers showed a definite need for a college program to train men for executive and managerial positions in the printing industry, and a wider training in the graphic arts field on the secondary school level from which to pick future executives. The Printing Industries of America in a survey of the industry found that there is an immediate shortage of 30,000 workers among its membership.

A Manual of Style, University of Chicago Press, revised 1946: A manual containing typographical rules and styles governing the publications of the University of Chicago. A reference book which should be in the library of all graphic arts departments and journalistic classes.

Junior Printing, Clifford K. Lush, 1943: A well illustrated work book, but one which does not give sufficient information to permit the student to carry out the project assigned. The author constantly refers the student to material in other texts to secure information to complete his projects.

His text like many others is of work book type. Space is left at the end of each chapter for the student to write in answers to questions given. At the end of the book an appendix is added in which the student is to paste proofs of his work, but in the binding of the book no allowance has been made for the extra bulk of this material. As in
most work books, this one has no resale value.


The Graphic Arts, Johnson and Newkirk, 1942: This book is intended to introduce the student to the graphic arts field and shows many possibilities within this field. It is well illustrated and gives a bird’s eye view of some twelve to fifteen divisions of the graphic arts field.

This book would have been usable in a course which surveys the industrial arts fields, had not the authors attempted to make a work book out of it by inserting a little instructional information and a few projects in each division. In many cases enough information has not been given to make the projects of value in a regular shop course.

General Printing, Cleton and Pitkin, 1941: This book is well written and would make a fine text book for any shop of high school level or higher. One of the two columns of each page is taken up with photographic illustrations of the various processes which are being explained. The one shortcoming of this book is that it leaves up to the instructor the task of finding suitable projects for the student, so he may apply the information given.

Printing--Elementary Composition, Cleveland Public Schools, Cleveland, Ohio, 1940: The material covered by this
one year course is about the same as covered in this thesis, but the information is not complete enough to prepare the student to carry out the projects successfully.

**Printing Types, Daniel Berkeley Updike, 1937:** The complete history of the development of type faces from the invention of printing to the publication of these volumes. These would make fine reference books for any graphic arts library.

**Printing Syllabus, Board of Education, Rochester, New York, 1937:** Outlines a four year printing course for the high schools of that city.

The investigator does not feel that the outline for their first year course is sufficiently broad and inclusive.

**300 Hour Course in Printing, Jay D. Rudolph, 1930:** This course was written as a basis of instruction for industrial arts students who were preparing to become printing instructors. This was used for years at Oswego State Normal and Training School, Oswego, New York.

**The Practice of Presswork, Craig R. Spicher, revised, 1929:** A technical book on various types of press work. Good as a reference book for industrial arts libraries or as an instruction manual in advanced vocational presswork classes.

**I-T-U. Lessons in Printing, Issued by the International Typographical Union, 1929:** Consists of a series of lessons which all union apprentices are required to complete during a six-year apprenticeship training period. These lessons are
probably the most complete course which exists on printing. They make a valuable set of reference books, and are used exclusively in vocational schools which have the local approval of the I.T.U. committee on education.

**Composition and Presswork, Arthur J. Mansfield, 1929:** Written as an aid to apprentices in the trade or in schools training students for the trade, this book considers each project as a practical job and gives the shop practice connected with each job. It is a valuable reference book for any apprentice working in the trade or for students in vocational training courses.

**Junior High School Printing, R. Randolph Karck, 1928:** This work book was designed for Junior High School exploratory courses. It consists of forty-nine assignments. The book could be purchased up until the past several years. One of the shortcomings of this book is that it provides pages in the book to insert proofs of the work set in type and also pages to complete answers; as a result the book has no resale value. It does provide the student with a complete notebooks of the year's work. But this can also be accomplished in the way suggested in this investigation under the heading Method of Treatment. It was also found that sufficient information to make the processes and projects clear was not given. Example: In the explanation of the rules for setting poetry only three styles of poetry indentations were given and the various rules explaining
the use of indentations were given in less than one hundred words. Typographic rules were given on one page and violated on the next page, and in the eighteen years this book was on sale, the book was not revised or brought up-to-date.

The Practice of Printing, 1926, Elementary Platen Presswork, 1931, and Elementary Printing Job Sheets, 1928—Ralph W. Polk: These three books are probably the most popular student printing textbooks published to date, outside the I.T.U. textbooks, and have been the most widely used texts in schools since their publication.

The Practice of Printing and Elementary Platen Presswork cover the composition, imposition, presswork and bindery fields on the technical high or vocational school level and they make fine supplemental references on the industrial arts level.

The Elementary Printing Job Sheets are written as a work book to go along with The Practice of Printing. The student reads the assignment in this text then answers the questions; does the work assignment, and puts the proof in the work book.

Instruction Manual for Young Printers, Selvidge and Witt, 1926: This book is not properly organized for student use. Twelve type setting tests are listed in the front of the book. These tests are supposed to cover fifty operation lessons and twelve informational subjects
developed later in the book. The operations do not provide any practical exercises, but are purely informational, and the texts do not go from one level of difficulty to another, and frequently omit essential instructional information.

**Benjamin Franklin, Printer, John Clyde Oswald, 1917:**
The life history of Benjamin Franklin deals primarily with his activities as a printer. A splendid reference book for any graphic arts library.

**Practical Typography, George E. McClellan, 1913:** This book constitutes a good manual for styles of composition, but that is all the book contains.

**The American Handbook of Printing, Edmund G. Gress, 1907:** Probably one of the earliest textbooks published for printing education. At the time a very thorough treatise on the printing industry. A fine reference book for school shops.

After examining these materials the following general statements seen to be justified.

1. At the present there is no process-project work book on the market which meets the needs of the particular setup of the graphic arts department of the Tucson Senior High School, Tucson, Arizona.

2. One of the primary causes for the lack of popularity of the work books is the fact that they are so constructed that they are usable but once.

3. In many texts the information is inadequate to serve the purpose for which the book was written.

4. A number of the better books are written on the vocational school or apprenticeship training level.
Statement of the Problem

The experience of the investigator and that of other teachers in the field of printing indicate clearly the need for functional materials for both the teacher and the pupil. Good materials are especially necessary for the pupil.

The problem of this study is to analyze the processes and projects of graphic arts into their increasing degrees of difficulty and to develop a series of process and project sheets suitable for a one year course in graphic arts on the high school level.

Limitation of the Problem

Due to the fact that there are twenty-four fields of the graphic arts, this study will be limited to these four basic divisions:

1. Hand composition
2. Imposition
3. Presswork
4. Bindery
CHAPTER II

PROCEDURE

Organization

"How much knowledge would survive the discovery, if it were not for our art of printing? Knowledge is the chief asset of civilization. It is in our keeping. You are the torch bearers. Lift up your heads, O Printers!" Henry Lewis Bullen, 1928.

In selecting the subject matter to be used for the process and project sheets, the investigator will choose the information which has appeared most frequently in the various textbooks, and will add those things which fifteen years of teaching have indicated as being essential.

The next step will be to construct sufficient process and project sheets, arranged in order of difficulty, to take the student through a one-year course as designated in the Limitation of the Problem. The process and project sheets will be written in separate units, as designated in Chapter II in the Analysis.

The process and project sheets have been administered to the first year graphic arts students of Tucson Senior High School. The results were carefully checked and the parts which were not clear to the students were rewritten and checked until desirable results were attained.

At this time I wish to express my appreciation to Harry A. Goldstein and Herman A. Klenck, both of the graphic
arts department of Tucson Senior High School, for their helpful suggestions and assistance in administering and checking many of these process and project sheets in their classes.

Analysis

"The doors of wisdom are never shut."
Franklin

Process Analysis: So that we may know the order in which the processes for the general divisions of printing should be taught, it is one of the problems of this thesis to evaluate the processes and projects and list them in the order of their difficulty, so that the work sheets may be constructed in that order.

As process learning is active, the processes will be stated in the active form. The processes will also be given a key letter and a number. Thus it will be possible for the student to refer to the list of numbers under each project to ascertain the processes required and the order in which they should be performed. The following key letters will be used for the four divisions.

Composition . . . . . . C-1, C-2, etc.
Imposition . . . . . . I-1, I-2, etc.
Presswork . . . . . . P-1, P-2, etc.
Bindery . . . . . . . . B-1, B-2, etc.

Processes:

Composition:

C-1: Learning the parts of type.
C-2: Learning the type case, Part I.
C-3: Setting the composing stick.
C-4: Learning the type case, Part II.
C- 5: Learning the printer's system of measurement.
C- 6: Learning the spacing system.
C- 7: Distinguishing difficult characters.
C- 8: Learning to read type.
C- 9: Learning the use of leads and slugs.
C-10: Classifying type faces.
C-11: Spacing and justifying lines.
C-12: Tying type forms.
C-13: Taking proofs.
C-14: Proofreading.
C-15: Making corrections.
C-16: Distributing type and type forms.
C-17: Setting punctuation marks, Part I.
C-18: Setting punctuation marks, Part II.
C-19: Justifying full lines.
C-20: Spacing optical illusions.
C-21: Setting and spacing capitals.
C-22: Setting indentations.
C-23: Setting hanging indentations.
C-24: Setting diagonal indentations.
C-25: Setting squared indentations.
C-26: Setting half-diamond indentations.
C-27: Setting poetry indentations.
C-28: Letter spacing.
C-29: Piecing leads and other spacing materials.
C-30: Lining leaders with figures.
C-31: Lining Roman numerals.
C-32: Setting multiple justifications.

Imposition:
I- 1: Spacing out a form.
I- 2: Locking up a form.

Presswork:
P- 1: Putting the job on the press.
P- 2: Feeding the press.

Bindery:
B- 1: Cutting stock.
B- 2: Caring for printed stock.
B- 3: Padding printed stock.
B- 4: Case making processes.

Project Analysis: The next step will be to compile a list of the most widely used printing projects, beginning
with the one which requires the smallest number of and the most simple processes and progressing through to the more difficult.

Under each project will be listed the process numbers which will be required to complete the project successfully. As the project increases in difficulty, new process numbers will be added. And as soon as a student has completed enough projects so that the basic processes have become automatic, these numbers will be dropped from the project, but it is assumed that all projects will require these basic processes.

Projects, and the processes required for completion.

1. Imprinting a Book Plate.
   C-1 through C-20.
   I-1 and I-2.
   P-1 and P-2.
   B=2

2. Imprinting Christmas Cards.
   C-1 through C-20.
   I-1 and I=2.
   P-1 and P-2.
   B=2

3. Printing a Personal Card.
   C-1 through C-20.
   I-1 and I-2.
   P-1 and P-2
   B=2

4. Making a Memorandum Pad.
   C-1 through C-20
   I-1 and I-2.
   P-1 and P-2
   B-1, B-2, and B-3.
5. Making a Telephone Pad.
   C-1 through C-22
   I-1 and I-2.
   P-1 and P-2.
   B-1 through B-3.

   C-11 through C-26.
   I-1 and I-2.
   P-1 and P-2.
   B-1 and B-2.

7. Printing Personal Envelopes.
   C-11 through C-26.
   I-1 and I-2.
   P-1 and P-2.
   B-1 and B-2.

   B-1, B-3, and B-4.

   B-1, B-3, and B-4.

    C-17 through C-22.
    I-1 and I-2.
    P-1 and P-2
    B-1, B-2.
CHAPTER III

PROCESS AND PROJECT SHEETS

Method of Treatment

"The Practice of Typography, if it be followed faithfully, is hard work--full of detail, full of petty restrictions, full of drudgery, and not greatly rewarded as men now count rewards. There are times when we need to bring to it all the history and art and feeling that we can, to make it bearable. But in the light of history, and of art, and of knowledge, and of man's achievement, it is as interesting a work as exists--a broad and humanizing employment which can indeed be followed merely as a trade, but which if perfected into an art, or even broadened into a profession, will perpetually open new horizons to our eyes and new opportunities to our hands."  

D. B. Updike.

It is assumed that these process and project sheets do not contain all the information on these subjects, but they do contain the basic materials needed for a comprehensive understanding of these subjects.

It is expected that the instructor will present other information which he may consider desirable, or necessary for his particular shop or local setup.

These lecture-demonstrations should be given at the beginning of each natural break in subject matter and should tend to hold the class within natural groups of subject material.

The value of these process and project sheets in the eyes of the investigator is that after each basic lecture-
demonstration by the instructor, each student may work along as fast as his own ability permits. This allows the instructor more time to work with those who are slower and need help.

It also does not forget the bright student. As these students complete the natural group, the instructor should assign further projects which are within the ability of the student and are live projects. These special projects help to keep the students within natural groups. Live projects are jobs which can be used by various departments in the school, such as club membership cards, certificates, posters, programs, office forms, etc. Live jobs are advisable where they can be controlled by the instructor and made to fit into the subject material at hand. This type of selection works particularly well where the shop has advanced courses, the work of which is largely of a production nature. Then the instructor can select such projects from the current jobs as fit the needs of the elementary group, and the remainder can be left for the advanced students.

As shown in the Survey of Materials in the Field, one of the major objections to the workbook is the fact that it can be used but once. To avoid this difficulty, the process and project sheets are being printed in regular book form with specific assignments given therein. The student is requested to make a note-book cover as a
bindery project and keep in it lecture notes and graded proofs of each process and project assignment.

Other materials which are furnished the student for his note-book are safety rules for the shop, proof reading marks and method of using them, proof reading tests, and the method of grading in the shop.

The instructor should set up a chart showing the minimum number of processes and projects required from each student to complete the course. In this way each student knows exactly what work he has to accomplish in shop from day to day.

The instructor should also keep a chart in his grade book with all the processes and projects for the term listed. As the student hands in the proof sheets or finishes a project, the grade should be recorded. In this way the teacher can tell at a glance how the students are doing and where each stands with regard to the rest of the class.

In the attached envelope in the back cover of the book are samples of some of the lessons which have been printed and administered to the graphic arts classes.

Process Sheets

Printing:
"In me all human knowledge dwells;
The oracle of oracles;
Past, present, future, I reveal,
Or in oblivious silence seal;
What I preserve can perish never--
What I forget is lost forever.
I speak all languages, by me
The deaf may hear, the blind may see,
The dumb converse, the dead of old
Communion with the living hold.  
All lands are one beneath my rule;  
All nations learners in my school.  
Men of all ages, everywhere,  
Become contemporaries there.  
James Montgomery, 1771-1854.

Hand Composition:

C-1: Learning The Parts of Type

Type is a rectangular piece of metal with a character cast in relief on one end. The height of type, that is, the distance from the base or feet on which it stands to the surface or face which prints, is .918 of an inch or approximately eleven-twelfths of an inch.

Type metal is an alloy consisting of 60½ per cent lead, 25 per cent antimony, 12 per cent tin, and 2½ per cent copper. Lead is used as the basic metal because it is fairly cheap and abundant and has a low melting point. The tin and antimony are added to make the metal hard enough to be serviceable. A small quantity of copper is added to increase the durability of the type.

![Figure V. Parts of Type](image)
Figure V is an illustration of a piece of type showing the different parts. These parts should be memorized, as knowing them will be an aid in setting type.

The raised portion of the type or that part which prints is called the **face**. The distance between the face and the shoulder, that is, the depth to which the metal is cut away, is called the **neck**. The part of the type enclosed within the lines of the letter and cut away to allow the letter to print is called the **counter**.

The **shoulder** or the strip cut away at the bottom of the type is to allow for such letters as $i$, $l$, and $p$, those extending above or below the average letters. If it were not for this shoulder, the lines of type would run together and it would be difficult to read the printing.

The face or printing surface of the type is made up of three parts: the heavy elements, called the **stems**; the light elements, called the **hairlines**; and the **serifs**, which are the caps or decorators placed at the ends of all unconnected strokes or at the connection of two strokes. These serifs vary widely with the style of the type design and give the greatest individual character to the different type faces.

Note the light and heavy elements and the various styles of serifs—or lack of serifs—in the following letters. Note how these parts affect the appearance of the type.
FIGURE VI. HOW ELEMENTS AND SERIFS AFFECT TYPE STYLES

The feet are the parts on which the type stands. The
groove is made by the planing tool which removes the jet
that was left at the time the type was cast. If this jet
were not removed to a depth greater than the feet, the type
would stand uneven on its feet and would not print evenly.

Some letters are kerned, that is, part of the type ex-
tends over the side of the body of the type, as in the letters
\( \frac{1}{2} \) and \( \frac{3}{4} \). Kerned letters are more common in italic types.

The nick on type serves three purposes: first, it indica-
tes the bottom of the letter; second, it is a guide in
picking up the type and placing it in the stick; third, it
tells the case of type from which it came. Every different
size and style of type has a different set of nick combina-
tions.

Small capitals have the same nick combination as the
font with which they are to be used except that an additional
nick is added high up on the body of the type on the letters
\( o, s, v, w, \) and \( z \), to help distinguish them from the lower-
case letters.

C-2: LEARNING THE TYPE CASE

The type case is a tray or drawer divided into many
compartments or small boxes of various sizes, one box for
each character.
A type case containing all the necessary type of one size and style is called a font. The following are the characters usually found in a font of type, but variations will be found to fit the needs of different designs of type:

<table>
<thead>
<tr>
<th>Capitals</th>
<th>Lower-case</th>
<th>Figures</th>
<th>Punctuation Marks</th>
<th>Ligatures</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
<td>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</td>
<td>$1 2 3 4 5 6 7 8 9 0</td>
<td>. ; : &quot; ' ? ! - ( )</td>
<td>ń ū ź ź ź ź ź ź</td>
</tr>
</tbody>
</table>

FIGURE VII. CHARACTERS IN THE AVERAGE FONT OF TYPE

The most popular case arrangement used today is called the California job case. This arrangement is shown in Figure VIII. The case is divided into three parts. Reading from left to right the first two parts contain the lower-case or small letters, figures, punctuation marks, spaces, quads, and most of the ligatures which that particular font of type may contain.

The two lower-case sections are not arranged in alphabetical order, but are so placed that the letters which are most frequently used are in the most convenient and largest boxes; this arrangement is called the lay of the case. It will be noted that the largest box is given over to the lower-case letter e, and that such letters as q, x, and k occupy the smaller boxes. There are 89 boxes in the
California job case.

The third section contains the upper-case or capital letters. Because the caps are not used often, they are arranged in alphabetical order with the exception of J and U, which are found at the end of the alphabet. The reason for this is that at the time the type case was planned in Europe, the Latin language was then universally used in printing. This alphabet contained only 24 characters, so when printing was begun in languages having 26 characters, the J and U were added at the end of the alphabet. Such special characters as $, _, ( ), &, á, and ö, are placed in the extra boxes in the cap section.

FIGURE VIII. THE LAY OF THE CALIFORNIA JOB CASE

In the early days of printing when the text or body of books, magazines and papers had to be set by hand it was necessary to have large quantities of type for convenient use; for this reason, the original method consisted of two cases called the news and book cases, placed on a rack or type cabinet, one above the other. The lower case contained only that type which is found today in the first two sections
of the California job case. The upper case contained the capitals, small capitals, and such special characters as might be needed for the particular type of work being set. From this setup we derive the present-day commonly used terms lower-case for small letters and upper-case for capitals.

With the days of the Gold Rush to the West Coast and the need for transporting type across the continent a more compact case was needed so the California job case came into being. With the perfection of the linotype the need for news cases was eliminated, and the popularity of the California job case has continued to grow, since there is need only for occasional display lines or small jobs to be set by hand.

Many other styles of type cases have been developed for specific kinds of work. A few of them are double case, triple case, quarter case, and furniture case.

Type cases are kept in racks or cabinets, ordinarily made of wood or steel. The average single cabinet holds 24 cases; the double one holds 48. The cabinets are built to be as nearly dust proof as possible.

All type cases have been made in standard sizes so that they can be interchanged. The California job case will hold a weight font (for setting the text or body matter) of 20 pounds of type and five pounds of spaces and quads. A job font weighs only five pounds and is designed for use
when it is necessary to set only a few lines of type from a case.

C-3: Setting The Composing Stick

A composing stick is the device in which the compositor assembles the individual pieces of type into words and lines. This tool received its name from the fact that early printers used a rather crude wooden tray in which to set type.

The Rouse or graduated stick is a very popular model. This type is set by raising the clamp which loosens the entire adjustable section called the knee. Place the knee on the mark indicating the desired length of line you wish. Before setting the clamp be sure to see that the rectangular pins and the corresponding holes match. This keeps the knee from slipping and changing measure.

Most sticks can be set only to pica and half-pica (non-pareil) measures. A micrometer stick is made by Rouse which has a micrometer screw in the knee allowing it to be set at odd measures down to a quarter of a point.

The Yankee or ungraduated stick is set by raising the clamp or loosening the screw that holds the knee in place. Place in the stick a piece or combination of pieces of metal furniture which gives you the desired length. To allow for the squeeze, place a piece of index board at the end of the furniture and set the clamp or screw snugly. Never use slugs to set an ungraduated stick because their measure may not be accurate or they may be burred. If quads
are used to secure the desired length, do not use less than 36-point; dirt between them may give an inaccurate measure. Be sure none of the quads are burred.

Be careful never to drop the stick. Never force quads in at the end of a line and never set the clamp in place without first being sure that the pins are in the holes. Any one of these three things is likely to spring the stick and make it inaccurate for future use. Always remember that a stick is a precision tool and will not stand abuse.

C-4: Learning the Type Case

Care must be taken in handling type cases as dropping one will require hours of work in sorting all the letters and placing them in their proper places. Spilling type, type forms or cases is called spilling.

Orderliness is one of the first rules of any print shop. One can imagine what a hopeless task it would be to try to set type from the hundreds of type cases and thousands of letters if they were not kept constantly in order. It is important that each student do this; if he does not, it will be necessary for him to take time from his regular project to sort the case so that it is usable.

In removing a type case from the cabinet, draw the case slowly out about half way, take hold of each end firmly, and rest the front edge against the hip. Now draw the case completely out of the runs and carry without haste to the bank which has been assigned to you. Most cases are
pied by the carelessness and haste of students. Stand 
eerectly on both feet in front of the bank; do not lean on 
the case.

Begin by locating the lower-case letters in alphabetical 
order. Pick up each letter, holding it with the nick away 
from you; after looking at each one, return it to the case 
before picking up another. Do this by taking small groups 
at a time. After you are able to go through the alphabet 
with fair rapidity, pick out the letters which come in 
order as b-c-d-e-f-g, l-m-n-o-p, and t-u-v. Next note that 
the boxes are so arranged that a number of the most commonly 
used combinations are in the most convenient location, a-r, 
i-s, t-h-e, m-e-n-t, e-d, etc.

Next locate the various punctuation marks, numerals, 
spaces and quads. Go over the cap section noting the letters 
that start and end each line and any special characters which 
may be in this section.

Now that you are fairly familiar with the lay of the 
case, take the composing stick assigne to you, set it at 
18 picas, and set your name, street and city, first in 
lower-case letters and then in caps. Place the type in the 
stick from the left-hand side to the right, nick out, and 
place a space from the box marked 3-em space between each 
two words when using lower-case letters and an en quad 
between words when using caps; this is called spacing. Do 
not set more than one line at a time; you have not yet been
taught how to make the line tight enough (justified) to print. As you return the type to the case, be sure to place each letter in the proper box so that you will not pull the case. This will help you to become familiar with the looks and feel of type and is a much more interesting way of learning the case than having to memorize it before being allowed to use it.

**C-5: The Printers' System of Measurement**

Most trades have special systems of measurement peculiar to that trade. This is also true of the printing trade, which has its point and pica system of measurement. The point is approximately \( \frac{1}{72} \) of an inch. Twelve points make a pica. As has already been explained most leads are 2-points thick and slugs are 6-points thick. A slug is commonly called a nonpareil (non-per-eil'). From these divisions we are able to arrive at the following table:

- 6 points = 1 nonpareil
- 12 points = 1 pica
- 6 pica = 1 inch
- 72 points = 1 inch
- 72 picas = 1 foot

In setting the type for an average page, it requires hundreds and in many cases thousands of pieces of type, spaces, and spacing materials. The need for careful, accurate workmanship if the form is to be locked without difficulty can easily be seen. This is only mentioned to bring more forcefully to the attention of the student the need for learning these printing measurements and applying them to your work.
Although the point is the smallest unit of measure in the printing system, 1-point is not sufficiently small in many cases to justify a line, so the \( \frac{1}{2} \)-point space, \( \frac{1}{144} \) of an inch, was introduced to supplement the 1-point space already in use. The 1-point and \( \frac{1}{2} \)-point spaces are called thin spaces. The rules governing the use of these thin spaces will be given in a later assignment.

The instrument which is used to measure points and picas is called a line gauge, pica gauge, or pica stick. It usually has the measurement in inches on one side and picas and nonpareils on the other. Figure XXXII illustrates the pica gauge and its use.

As nearly everything in the shop is measured by the point and pica system, it is well for the student to master the system as early as possible. A piece of spacing material may be 5 x 20 picas, a piece of border is 25 picas long, a piece of type is 72 points or will reproduce one inch tall, a page should be spaced out to 24 x 36 picas to fit a 30 x 42 pica sheet of paper, and a line should be set 18 picas long; these are only a few examples of the many uses to which the measurement system is put.

C-6: Learning The Spacing System

When a line of type is set or composed, space must be left between words just as is done in writing or typing. This is done by inserting between words or groups of figures a rectangular piece of metal which is less than type high; this is called a space.
The wider spaces are called quads, and are used for indentations at the beginning of sentences, for larger spaces between sentences, and for spacing out at the ends of lines which do not fill a full paragraph. There are complete sets of spaces for every size of type.

The unit of measure on which the spacing system is built is a square, or em quad; that is, an em is the square of the body of any size of type. Thus we see that squares of 12-, 24-, 36-, 48-point type are all em quads as follows:

FIGURE IX. EM QUADS

Thus, if we say that any size em contains 100 units, we have a basis on which to work. The next smaller space is the em quad, which is one-half of an em or 50 units. Anything that contains less than 50 units is classed as a space, and anything 50 units or more is classed as a quad. The spaces are 3-em spaces (3 to make an em or square), containing 33\(\frac{1}{2}\) units; the 4-em space (4-to-the-em), containing 25 units; and the 5-em space, containing 20 units.

In order to save time in filling out lines and in places where other large spaces are needed there are the 2-em and 3-em quads containing two and three squares.

Following are the spaces and quads found in the average case:
FIGURE X. SPACES AND QUADS

All the spaces are in the first section of the case, and all the quads in the second. Keep this in mind, and it will save much time.

The following chart indicates the relationship of the various spaces to the em quad:

FIGURE XI. RELATIONSHIP OF THE SPACES TO THE EM QUAD

Following is a list of the combinations in widths that can be obtained to space between words and at the end of sentences or paragraphs:
In type larger than 12-point we find 6-em spaces and smaller divisions of spaces as the size increases. This is to enable compositors to find space combinations which will justify or space out the large sizes of type. In type larger than 36-point, only spaces up to 1-em quads are kept in the case. Spacing materials for centering and spacing-out lines are usually hollow and are kept in a special case. They are called railroad furniture.

There are also thin spaces \( \frac{1}{2} \) and 1 point thick. In 10-point type or smaller these thin spaces are used only in letter spacing and according to the rules for their use; in 12-point or larger type they are used to justify lines.

Because of the similarity in the words en and em quad, they have been given names to avoid confusion. The en quad is called nut quad, thick space, or figure space. They are called figure spaces because in most fonts the figures are
the same thickness as the en quad. The em quad is called a 
matt quad; but, for the sake of clarity, we will use only 
the term em quad.

C-7: Distinguishing Difficult Characters

There are a number of letters which cause the beginner 
a great deal of trouble. The most common offenders, which 
are known as the four demons, are the b, d, n, and q. Other 
characters that also bother are n, u, 6, 2, l, I, 1, 0, 0, o, 
2, 7. Figure XIII is an aid in distinguishing those which 
are puzzling. The first and third rows show how the char­
acters look on the type if they are held with the nick away 
from you, while the second and fourth rows indicate what the 
characters are. Whenever you are in doubt as to what a letter 
is, consult this chart:

FIGURE XIII. AID IN DISTINGUISHING DIFFICULT CHARACTERS

Before you will be permitted to set type it will be 
necessary for you to be able to distinguish all of these 
puzzling letters at a glance. In order to do this, take one
of each of the letters shown in Figure XIII, hold them in your hand; practice picking out one at a time and naming them until you are familiar with them. Be sure to hold the letters with the nick away from you. This is how all type should be read. It is as easy to form correct habits when learning a new process as it is to form incorrect habits.

Ligatures and logotypes fall in the class of characters which are difficult to distinguish. Ligatures are two or more connected letters which are cast on one body such as \( \text{f, f, f, m, m} \), and \( \text{w} \). Their use is necessary because one or more letters are kerned and if they are placed side by side the kerns or the top portion of the \( \text{i, l} \) will be broken. Some fonts of type do not contain ligatures because the letters are so designed that they need not be kerned.

A logotype is two or more letters on the same body not necessarily connected and usually a complete word. Logotypes vary with the type design and the taste of the designer. Following are the logotypes of the more common type families:

<table>
<thead>
<tr>
<th>Text</th>
<th>Italic</th>
<th>Roman</th>
</tr>
</thead>
<tbody>
<tr>
<td>α  β γ</td>
<td>α  β γ</td>
<td>α  β γ</td>
</tr>
</tbody>
</table>

FIGURE XIV. LOGOTYPES FOUND IN VARIOUS TYPE FONTS

C-8: Learning To Read Type

In order that you may become both accurate and swift in setting type it is necessary for you to be able to read it in the proper manner. When you first attempt to read type you are very likely to become confused for it is upside down.
You have already been instructed always to hold type with nick away from you. This is also true of reading type in a stick or form; read it upside down, with the nick away from you, and from left to right.

Figure XV shows how a paragraph looks both in print and when set in a stick. Cover up the lower paragraph and practice reading the upper one just as you would read type in a stick.

Type is read from left to right as are the lines on the printed page, but the characters are upside down. With a little practice the reading of type will become easy. Do not read type in any other manner than upside down, from left to right.

**FIGURE XV. HOW COMPOSED TYPE LOOKS IN A STICK AND IN PRINTED FORM**

C-9: Learning The Use of Leads and Slugs

**Leads** and **slugs** are thin strips of lead used to increase the space between lines. The strips are less than the height of type so that they do not print. Leads are made one, two, three, and four points thick. Slugs are six points or more thick; these are referred to as 6-point or non-pareil slugs and 12-point or pica slugs. The two widths with which we are at present concerned are the 2-point leads and the 6-point slugs.
These are found in the lead and slug rack in the type cabinets or in special lead racks centrally located for the students' use. They are cut to labor-saving lengths, that is, in lengths commonly used. In measures from four to ten picas they are cut in half-pica lengths as well as pica, and from 10 to 50 picas in lengths. All racks do not contain lengths up to 50 picas. This depends upon the size of the lead rack. The leads are generally found on the left-hand side and the slugs on the right-hand side of the cabinet. Sometimes the racks are double and the leads are above the slugs.

Spacing materials 6-point and pica thick, cut in labor-saving lengths but made of wood, are called reglets. Wood is used to lengthen a form where considerable amounts of space are needed between lines.

The act of inserting space between lines is called leading; this makes the type more legible and takes up more space. When there are no leads used between lines, it is said to be set solid. The following are examples of solid and ledged type:
Solid

The highest tribute ever paid to the printer's craft was expressed in the words of one of the world's greatest minds, who, in writing his own epitaph, put aside his triumphs as scientist, philosopher, reformer, statesman, diplomat, and began: "Benjamin Franklin, Printer ***

Labeled

"And this, our noble art of Printing, is the very foster mother of all learning; for although a few had books before John Gutenberg gave us our art, not until Printing came could learning, yea and Wisdom also, knock at every man's door."

-Latin of Cardelius, 1546.

C-10: Classifying Type Faces

Type faces, like human faces, can be divided into many different classifications. The most accurate classification would be the kind of serif, or lack of serif. In view of the fact that this method is more complicated, it will serve our purpose here to use the more popular five-division classification: Roman, Italic, Text or Black letter, Gothic or Block-letter, and Script.

![Figure XVII. Examples of Five Type Classifications](image)

The vast number of type designs, modifications of
type faces, and combinations of characteristics of one type division with another, sometimes make it difficult to classify the type face correctly.

Text developed in Northern Europe as the style for hand-written manuscript books. Thus, when movable type was first cast it was natural that this was the style used. Text is widely used for wedding and formal announcements. In fact it persisted for textbook use in Germany until World War I, when the large number of Germans with defective eyesight brought to the attention of the government that this defect was due to the illegibility of text type.

In Southern Europe the Romans had developed a more legible form for manuscript writing adapted from the Greek form. When printing was introduced in Italy the latter part of the 15th century, this was the form in which they cast their type. This has proved to be the best fitted for newspaper, magazine, and book use.

At the beginning of the 16th century Italic type was designed. This consisted of nothing more than taking the Roman letter and sloping it to conform closer to hand writing. Italic type combines well with Roman and is used for Title heads, explanatory lines under illustrative material, for definitions in the text of a book and where special emphasis is desired.

The block-letter, when introduced into this country, was Gothic in the type catalogs and is still referred to by that
Name. So we will use that term to apply to all types of block design. The European name for this style letter is Sans-Serif and is referred to in many textbooks. Gothic is widely used in professional stationery, formal business cards, newspaper headings, and display work.

Script division includes those faces which are patterned after modern handwriting and varies as widely as does individual writing. This division of type is used for invitations, stationery, name cards and is an imitation of copperplate engraving.

Each of these type divisions has special typographic rules to be followed in using that particular type. These rules will be taken up as projects at the time each division of type is discussed.

Within each one of these classifications of type we have families of type. A type family consists of all the various modifications and sizes within the same style design. Although Italic is listed as a separate type classification, it resembles Roman type. Consequently the two combine well together. For this reason most families of type include both Roman and Italic. Beside the Roman and Italic most families of type include a bold, condensed and outline of that face of type. Figure XVIII is an example of a family of type.
FIGURE XVIII. SOME MEMBERS OF THE CHELLENHAM FAMILY

A family also consists of all sizes of type from the smallest to the largest size. The most common sizes of type are shown in Figure XIX. The various sizes of type within a family are called a series.

FIGURE XIX. A SERIES OF GARAMOND TYPE

A family of type enables one to use the same type design for an entire poster, program or book. This makes for a pleasing harmony within the entire job.
C-11: Spacing and Justifying Lines

Justification means the spacing out of a line so that it will fit firmly in the stick. All lines must be equally justified. A line, to be properly justified, should move easily up and down in the stick and yet be tight enough so that when it is tipped slightly forward it will remain in that position without falling over.

FIGURE XX. A JUSTIFIED LINE OF TYPE

When setting type always use 3-em spaces between words unless otherwise stated. If the line does not fill the stick, place spaces and quads at the end of the line to fill. Always place the largest space at the end of the stick and the thinner ones next to the period.

Never force a space into a line as you are apt to spring the stick and throw the other lines out of justification. When placing a space in a line always remove a quad or larger space, then insert the small space and return the quad. This will prevent bending the space.

If a space goes in hard, do not force it, but find a combination of spaces that will make a few points less and still justify the line. For combinations of spaces see the lesson on spaces and quads.
For your first assignment take a stick, set it 20 picas long and set your name, number of your type cabinet and group in the following style, so that the first letter comes flush with the beginning and the last letter flush with the end of the line:

John Doe, No. 20

Period 4

Show this line to your instructor and after you have his O.K. set the following exercise, using 3-em spaces between the words and spaces out the end of the line:

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.
Pack my box with five dozen liquor jugs.

Read each line and make any corrections necessary before spacing it out and going to the next line.

The following illustration shows the proper method of holding a stick.

FIGURE XXI. CORRECT WAY TO HOLD A STICK
After these lines are set, tie up the type according to the lesson "Tying Up Type." Then take a proof on a proof sheet, mark the mistakes according to the marks shown in the lesson on "Proofreading." Next correct mistakes and take another corrected proof below the first and submit for a mark before going on to the next lesson.

Now read the lesson on distribution and throw all of the lesson in, except the first line. This line should be kept as it goes at the head of every lesson you set.

C-12: Tying Type Forms

Before taking a proof of what you have set, it is necessary to tie up the type with a string to keep it from being pied when handling.

When taking a proof that does not fill the stick, it is not necessary to remove the type to a galley unless the stick does not set flat on the proof press.

A galley is a three-sided shallow tray used for taking proofs and storing type.

When removing type from a stick, remove the knee, place the tray on the galley and slide the type out. Do not attempt to lift type when not necessary; always place it in the left-hand side of the closed end with the nicks toward the open end. Never leave loose type on a galley; always tie up all forms. Great care must be used in handling loose type.

A string 24 to 36 inches long is generally sufficient length to tie the ordinary type that can be set in a stick.
Every form should have at least four or five complete wraps of the string. After you have tied a few forms you will be able to judge the necessary length.

FIGURE XXII. HOW TO TIE UP A TYPE FORM

Take one end of the string in the left hand, lap an inch around the upper left-hand corner and wind it around the type clockwise. Each layer of string should be lapped by the one following so that it binds the previous lap fast. Continue to hold the type and the stick with one hand and wind with the other so that it will not pi the type. At each corner draw the string tight so that it will hold the type firmly. Tuck the end of the string with a rule and draw the loop tight. **Do not tie a knot.**

FIGURE XXIII. HOW TO FASTEN THE END OF THE STRING
C-13: Taking Proofs

The act of securing a printed copy of a type form is called pulling a proof, and the copy itself is called a proof. It is necessary to secure a clear, clean proof; a poor, messy proof will not permit the person reading the copy to detect all the errors and damaged type. The person reading the copy is called a proofreader.

After the type is tied, place the stick or the galley on the proof press with the open end toward the roller. The roller with which the ink is applied to the type form is called a proofroller or brayer.

Check the form to see that no type or leads extend above the level of the type face, that the type is on its feet, and that the end of the string is not under the form. Most presses have a proof press plate which is used when taking proofs of forms or cuts which are not already on a galley. If this plate is not removed and a stick or galley is placed on top of it, the additional height will raise the face higher than type high, with the result that when the roller is run over the type it will batter the surface and damage the packing on the press. If the roller does not pass freely over the type form, do not force it but back it off and check to find out what the trouble is.

Run the brayer over the ink plate several times to secure an even amount of ink; then run it over the type several times to cover the entire surface. When inking the form, be
sure to hold the brayer in such a position that the lugs do not scrape the face of the type. Use a light, even pressure when inking the form, as heavy pressure will cause the ink to pile up heavier and to print blacker on one side while it will be wiped off and give a lighter print on the other side. Now place the proof sheet squarely on the type; do not move after it touches the type, because it will blur the proof. The head of the proof sheet should be toward the head of the type. Run the roller over the type for your proof. Do not double-roll a proof or allow it to drag or slide along the surface of the type; this will also blur the proof.

Take a small rag; be sure it is free of buttons, snaps or other metal objects which might scratch the type. Fold it into a ball in order to do away with the loose ends. Dampen with a small amount of cleaning fluid and wipe the type form toward the solid corners of the galley. Shake out the cloth and wipe the type again with a part of the cloth that is not damp with cleaning fluid. An excessive amount of cleaning fluid on the cloth will leave a film or oily surface on the face of the type; this will prevent you from securing a clean proof the next time the type is used.

C-14: Proofreading

After the type has been set and a proof taken, the next step is to read the proof to mark the mistakes and to make the necessary corrections. For this purpose printers have adopted a set of standard proof marks, although these vary
slightly in different localities. The ability to read proof in a workman-like manner will be of value through life.

Using the marks shown in Figure XXIV indicate the errors found in the copy. Use a medium-hard lead pencil so that it will not smear the proof and make it difficult to read. If the error is in the first half of the line, place the proof-reading mark for the correction in the left-hand margin; if the error is in the second half of the line, place the proof-reading mark in the right-hand margin. Place these marks in the margin in the order of their occurrence from left to right, placing a diagonal line after each one to indicate that they are separate errors. Draw a neat short line through the part that is wrong in order not to make the characters illegible. Do not draw lines from the mistake through the copy to the margin; these make the proof difficult to read. These lines are called kite strings.

If the proof to be read consists of only a few lines the person reading it can hold both the copy and the proof and compare one against the other word for word. If the copy is long it is necessary to have a copyholder to assure accuracy. The copyholder reads the copy aloud slowly, indicating such things as paragraphs, punctuation, capitalization, and spelling of all unusual words. The job of the proofreader is to mark all errors which have been made, as well as broken letters, wrong font letters and mechanical errors and to see that nothing has been changed or omitted from the copy.
FIGURE XXIV. STANDARD PROOFREADING MARKS

A dictionary should be consulted when there is the slightest doubt about the spelling or division of any word. The compositor and the proofreader must "follow the copy"; in no case may either change the wording because they feel it to be better. They may place a query mark in the margin to call to the author's attention the questionable part. Of course it is the duty of both to correct obvious errors.

The first proof read is called the office reading. The reading by the person submitting the copy is called the author's reading. Changes in the copy of the original manuscript are called author's corrections, and are to be avoided; all shops charge for such changes. After the corrections have been made, the first revise is taken to check and see that no mistakes have been made in the correcting of the copy. If further mistakes are found a second revise is taken.

In checking linotype corrections be sure to see that in inserting the corrections the wrong line is not removed. Sometimes it is impossible to get the correction in one line; in this case you have a runover and is necessary to check carefully
to see that no part of the line is left out. In many cases it is necessary to reset all the lines from the part left out down to the end of the paragraph.

After you have read a proof place your initials in the upper right-hand corner; this indicates that it has been read.

C-15: Making Corrections

After the proof has been read the next step is to make the corrections. When only a few lines have been set and a proof has been taken while the type is in the stick, it is possible to correct the errors by tipping forward the lines below the errors, placing a quad below these lines so they will not fall flat in the stick. In this manner the line to be corrected is exposed.

If a large amount of handset type is to be corrected, place the galley on the work bank with the open end away from you. Separate the type below the line in which the correction is to be made as shown in Figure XXV. Always place a piece of furniture at the end and between the separated type so that they will not be tipped over and piled.
Hold the type as shown in Figure XXVI. With the thumbs and first fingers grasp the type on the top and bottom; and with the middle fingers press on the ends of the lines.

**FIGURE XXVI. THE PROPER WAY TO HANDLE LINES OF TYPE**

A firm pressure will keep the type from spilling if the lines have been properly justified.

After the type to be corrected is in the stick, remove a letter at end of line; if it is the end of a paragraph, remove a quad. This gives the compositor a free line to work with and cuts down the chance of piling the line while trying to force letters in and out of a tight line, Figure XXVII.

**FIGURE XXVII. THE PROPER WAY TO MAKE CORRECTIONS IN THE STICK**

Each time a correction is made in the line it is necessary to justify the line as many of the letters vary in width and are thus not interchangeable. Letters can be changed in
the line without rejustification of the line, only when broken letters are changed for unbroken ones or when they have the same body size.

C-16: Distributing Type and Type Forms

When a type form has been printed or has served its purpose, it is known as a dead form, that is the type may be put back into the case and the spacing materials sorted and returned to their proper places. To kill a form is to place it on the dead galley for distribution. The returning of the type to the cases from which it came is called distribution, and the putting away of the furniture and spacing material used in the form is called breaking up.

Large quantities of type are distributed from the galley. When there are more than one size or style of type, each kind should be separated, and placed together on the galley, this helps to avoid errors in distribution. As a further precaution against getting type in the wrong case, do the following three things with each line of type as it is distributed:

1. check the size of type to see it is the same as that which is in the case;
2. check the nicks to see they are the same;
3. check the face to see they are the same. It will only take a second to check each line, and this caution will save hours of work sorting cases to get the wrong fonts back into the right cases.

In placing type to be distributed on a galley the head of the form is placed towards the closed end of the galley.
the same as it was when being set. In distributing type, take the number of lines which can be held easily from the open end or foot of the galley. Furniture should be placed along the right hand side of the galley to minimize the danger of spilling the form.

Wherever possible have a copy of the type which is being distributed at hand; this speeds up the rate of distribution and cuts down on the number of errors.

When there are only a few lines of type to distribute these may be placed in a stick and distributed from it, but any large quantity should be distributed in the above described manner.

Figure XXVIII shows the proper manner in which to hold type while it is being distributed. The amount of type held

FIGURE XXVIII. PROPER METHOD OF HOLDING AND DISTRIBUTING TYPE

at one time for distribution is called a lift. The lift is picked up in the same manner as pictured in Figure XXVI. When the type is in this position, shift the position of the left hand so that the palm is up, the left thumb is against the left end of the line, the middle finger against the right end of the line and the center of the line is supported by the
index finger. A slug should be used to support the bottom line.

The next step is to take in the right hand the amount of type which can be held easily, as shown in Figure XXVIII. This is usually several small words or one longer word. Read the word so as to know the letters which are to be distributed, be sure you have checked the type to be sure the nick, size, and face agree with the case into which you are distributing and then proceed to drop the letters into the case as shown. The type is always taken from the right hand end of each line of type.

The type is held between the thumb and the first two fingers. It is quite a knack to distribute the letters one at a time into the proper boxes. This is done by rocking the type between the thumb and second finger to break the type apart, and using the first finger as a trigger to release one piece of type at a time.

If there is type from another case in the line place these letters in the galley or a stick until the distributor is free to place them into the proper case. If the student drops a letter on the floor or into the wrong box, he should immediately return it to its proper box. In the larger sizes of type place them in the proper boxes, do not drop them, as dropping them damages the type.

Always remember a clean, careful distributor is one of the infallible marks of a careful workman. All students should strive to attain this goal as early as possible.
As forms are broken up leads, slugs and spacing material begin to accumulate. If these are allowed to accumulate in a pile, they are bent and battered up. The spacing material should be placed on a galley as shown in Figure XIX. After all the materials are on the galley bring all the longest pieces to the head, being sure to separate them in reglets, slugs and leads. Repeat this process, bringing up the next longest materials until all materials are arranged in order according to length, as shown in Figure XXX.

![Figure XXIX](image1.png) ![Figure XXX](image2.png)

Now the materials are ready to be returned to the racks where they are kept. This is the most efficient method of sorting up any large quantity of spacing materials. It is slower to try to sort them at the rack.

C-17: Setting Punctuation Marks, Part I

In setting punctuation marks no spaces should be used before the period, comma, colon, semi-colon, exclamation mark and question mark. No space is placed on either side of the hyphen or dash.
Set the following copy 15 picas wide. Place your name, etc., at the head of each lesson, as you did in the previous one. Use a slug at the beginning and end and a lead between lines. Use 3-em spaces between words and fill out the end of the lines with spaces and quads. Start each sentence with a capital letter:

Stand erectly before the case.
Is your stick set correctly?
If you drop type, pick it up.

In these lessons on punctuation, there is no attempt made to give the rules of grammar covering their use, but rather to give exercises showing their use as applied to typography. It is assumed that a student of printing already has a working knowledge of English grammar.

In order to become a successful printer one must have a good knowledge of English grammar; be a good speller; know the general rules for division of words, and the use of abbreviations.

The style of composition varies in different localities and printing establishments. For this reason the larger shops have their own style books which are small folders, giving the rules of punctuation, division of words, capitalization and abbreviation which they wish to have followed.

When the following letters and punctuation marks come next to the letter "f", it is necessary to place a one-point space between them in order to keep from breaking off the kern on the letter "f": --fb, f?, or f!
Read the first proof and mark any mistakes according to the proofreader's marks in the lesson on proofreading. Then make the corrections and take a second or revise proof below the first. Now place the proof in the job basket for your mark. Wipe the type clean of all ink with a cloth and a little gasoline from the gas can. Now, distribute the type carefully, according to the lesson on distribution.

C-18: Punctuation Marks, Part II

The hyphen (--) is used to indicate the division of a word and is always placed at the right hand end of the line. It is also used in the formation of compound words.

Dashes (--) are used principally in job and tabular work, but occasionally they are used as punctuation marks. There are four common sizes: En dash (--); em dash (---) 2 em dash (----); and 3 em dash (-----).

The en dash is used between two dates to indicate a period of time covered. The em dash is used to set off parenthetic phrases from the rest of the sentence.

Several em dashes may be inserted in a line to indicate the omission of a part of the sentence or paragraph.

Set the following copy 18 picas wide. Place your name at the head of the lesson. Use 3-em spaces between words and space and quad out the lines. Use leads between lines.

Love work--then you will succeed!
Lower-case (minuscules) means small letters.
He was a member of the class of 1939-1940.
Parentheses and brackets are used to set off an explanatory word or phrase from the rest of the sentence. They are usually found single in most cases and all that is necessary to make a pair is to invert one of the characters.

It is interesting to note how the various punctuation marks originated. The question mark or interrogation point had its origin in the Latin word quaesto, meaning to seek—the word was abbreviated to 2 and later to ?. The exclamation mark that is used to indicate surprise, joy, sorrow, etc., originated from the Latin word io, meaning joy. Its abbreviated form was "I" written directly over a very small "o", from which comes our present mark:—!.

Read the first proof and mark any mistakes according to the proofreader's marks in the lesson on proofreading. Then make the corrections and take a second or revise proof below the first. Now place the proof in the job basket for your mark. Wipe the type clean of all ink with a cloth and a little gasoline from the gas can. Now, distribute the type carefully, according to the lesson on distribution.

C-19: Justifying Full Lines

Have you ever wondered how the newspapers and books managed to have all their lines come out even at the end? In this lesson you will see how they accomplish that very thing.

In the preceding lessons you have set only sentences which filled part of a line, the balance of the line being
filled out with spaces and quads until the line was justified. In this lesson our sentences will contain more than one line. For this reason it will be necessary to make a full line of each except the last one, which may end where it will.

Set your stick 14 pica wide and place your name at the top as you did in the previous lessons. Now, set as much of the lesson below as you can in one line of the stick, using 3-em spaces between words. If the line does not come out full and you are able to divide the next word, (see dictionary for correct division) put as many syllables as possible on that line with a hyphen after the last letter and place the balance of the word on the next line after the first one is correctly justified.

Now, if the line is not tight enough start removing 3-em spaces, one at a time, and substitute a combination of two 5-em spaces in their place until the line is tight. If the combination of two 5-em spaces is not sufficient to make the line tight, go to the next larger combination. In extreme cases two 3-em spaces may be used.

If you find that the last space is either too tight or not quite tight enough you can find a combination of spaces (see lesson on spaces and quads) that will justify the line. After each line of this lesson is set show it to the instructor before going on to the next.

The invention of movable metal type in 1440 by John Gutenberg, of Maintz, Germany, was one of the greatest steps in the progress of printing.
The spacing in lines must be even. It is never permissible to put two 3-em spaces between one or two words to make a line tight, but must be spaced evenly between all the words with the next combination of spaces which will make the line tight.

Four-em and 5-em spaces are used only when it is necessary to gain a very little space at the end of the line, but this should not be made a general practice.

It is correct to use 4-em and 3-em spaces, or 3-em spaces and en quads in a line; but it is not correct to use spaces that vary as widely as 4-em spaces and en quads in the same line.

Show each line to the instructor before setting the next.

Read the first proof and mark any mistakes according to the proofreader's marks in the lesson on proofreading. Then make the corrections and take a second or revise proof below the first. Now place the proof in the job basket for your mark. Wipe the type clean of all ink with a cloth and a little gasoline from the gas can. Now, distribute the type carefully, according to the lesson on distribution.

C-20: Spacing Optical Illusions

Although a line may be spaced mechanically perfect, it may not appear so to the eye, due to the difference in the words that end and begin with tall letters, capital letters, or sloping letters. For instance, the space between two tall letters look smaller than the same space between two words
that end with low rounded letters. The words ending and beginning with slanting letters seem to have an even wider space than the two mentioned above.

Letters which appear to have more space between them are: a, c, e, o, s, v, w, and y. In capital letters, the difference is much more noticeable than in lower-case letters.

The following punctuation marks: period, comma, and apostrophe, also give the appearance that a large space has been used after them.

To counteract these optical illusions, a 4-em is used between the words which begin and end with a rounded or slanted letter, and a 3-em space, between those beginning with tall letters. A 4-em space should also be used after the comma, and apostrophe. When it is necessary to add more space to a line to justify it—increase the space according to the foregoing rules.

---

Now view the beautiful hill, as the sun is setting.

Although 3-em spaces are used in the line above, some spaces appear to be wider than others.

Now view the beautiful hill, as the sun is setting.

4-em spaces have been substituted for 3-em spaces between the words now and view; hill and as; and is the setting to give the effect of equal spacing.

---

Examples of Spacing Optical Illusions

Set the following copy 18 picas wide, and use the proper
spaces between words to make it look evenly spaced:

Two of Poor Richard's sayings were: "Early to bed, early to rise, makes a man healthy, wealthy, and wise," and "a stitch in time saves nine."

The opening quotation marks are made by turning two commas with the nick down or in some fonts there are regular opening quotation marks ("). The closing quotation marks are made by putting two apostrophes together ("'). No spaces are used between the quotation marks and the sentence quoted.

When justifying a line use as few spaces as possible; for instance, never put in two 4-em spaces when an en quad will fill the same space.

C-21: Setting and Spacing Capitals

Lower-case type is always more legible than capital letters of the same font. Capital letters are all of a bulky, rectangular shape which makes it more difficult to read. For this reason, sentences set in capital letters should be spaced with en quads between the words, and the lines should be double leaded, or even slugs placed between the lines to make them more legible. The lines should be set in as long a measure as possible to avoid the necessity of dividing too many words.

Set the following copy 18 picas wide, using en quads between words, em quads between sentences, and double leads between lines:
CULTURE MAY BE OF TWO KINDS: THAT FORCED ON MAN AND THAT ACQUIRED OF HIS OWN WILL. THE PRINTED PAGE ASSISTS A WIDE-AWAKE MAN WHO SEEKS CULTURE.

Capitals are used largely in titles and introductions to books; display posters, tickets, business headings, business forms, advertisements, news headings, etc.

Capitals set in the proper manner lend a beauty and a stateliness to the printed matter in which they are used.

In an article entitled "Advertising: Its Principles and Practices," published by the Ronald Press Company, the reason has been very clearly shown why capitals are not so legible. The article is reproduced below:

"Most of our reading is done by the perception of 'word form' rather than by a putting together of the separate letters of the word. The general shape and appearance of the word enables us to recognize it even when it is so far away that the separate letters cannot be seen at all. For this reason, the lower-case letters are much more legible than capital letters. Capitals do not permit of reading by word form; all words made up of capitals have the same rectangular shape, differing only in length. But when the lower case letters are used, each word has its own characteristic appearance.

C-22: Setting Indentations

When a change of thought occurs in a piece of reading matter, a new paragraph is started to indicate that change.

The size of the indentation varies with the length of the line, and the size and kind of type. The following rule holds good in general use. A line 18 picas wide or under should be indented one em quad; one and one-half ems for 18 to 24 picas, and two ems, if 24 picas or more wide.
Set the following copy 17 picas wide and indent the first line the proper amount of space according to the above rule:

Typography is the most influential of all Arts: It sends knowledge abroad as heaven sends the rain. One feeds the soil, the other, man's brain.

The above rule does not govern all classes of type setting, but may safely be used in ordinary composition. The instructor will explain other variations in indentations from time to time.

In the early days of typesetting printers used the paragraph sign (¶) to indicate the change of thought, but did not start a new paragraph. These paragraph marks are still used in some kinds of display work, but they are classed as typographic ornaments.

In the following lesson we will consider some of the other forms of indentations used to create different desired effects.

C-23: Setting Hanging Indentations

Hanging indentations are used in various styles of display composition. This type of indentation is just the reverse of the regular paragraph indentation. The first line is set the full width of the stick (when a line starts at the beginning of the line without any indentation, it is said to be flush). The following lines are to be indented the proper amount of space according to the rules given in the preceding lesson.
Set the following copy 13 picas wide, using the hanging style of indentation:

**WANTED — Apprentice for job and newspaper shop, to learn the printing trade. Must be industrious and reliable. Address: The Sun, New York City.**

Hanging indentation is used a great deal in newspaper and magazine advertisements, dictionaries, catalogs, headings, for newspaper articles, and many other kinds of printing.

C-24. Setting Diagonal Indentations

Diagonal indentation is still another form used by printers to give variation and pleasant effects to their work. This style is also used for newspaper headings, display advertisements, etc.

The first line is set flush and the line ends wherever it will. The second line is indented one em quad, and each line following is indented one em more than the one above.

If the line is set more than 13 picas, then each line is indented that much more, according to the rules given in the lesson on indentations.

Set the following copy 1¼ picas wide, double leaded, and use the diagonal form of indentation:

With the first creaking of the printing press, thought for the first time took wing.

When this lesson is finished both ends of the type should look like an even pair of stairs. If you have any trouble, ask the instructor for help.
C-25: Setting Squared Indentations

The squared indentation is used to set off a certain part of an article or display matter from the balance of the material and tends to draw the reader's attention to this section.

This squared effect is obtained by indenting both ends of the lines the same number of ems.

In newspaper and book composition the squared indentation is usually used when printing a direct quotation from some other author or book. In this case the rules for indentation, according to the length of the line, apply to both ends of the lines to be indented. And the last line ends where it will in a regular paragraph.

In display material where it is wished to call attention to some particular fact or group of facts this squared indentation is often used and here again the lines are indented at both ends of the lines in proportion to the length of the lines and the size of the type. Here good taste and judgment in a great many cases determine the amount of indentation to be used. Usually the last line of this squared indentation is centered, this differing from the newspaper or book paragraphs as noted above in this lesson.

In many cases the material to be used in squared form is set in a different size or face of type—or both. Note the two different types of squared indentations used in this lesson on Setting and Spacing Capitals.
Set the following copy in capitals, 20 ems wide, double leaded, and indent each line a 3-em quad on each end of the line. Be sure to set the line with your name, number, and period the full length of the stick so the instructor can see that the proper indentation has been used.

AS A MANUFACTURING INDUSTRY PRINTING RANKS FIFTH IN THIS COUNTRY WHEN JUDGED BY THE VALUE OF THE PRODUCT TURNED OUT. IN 1940 THIS AMOUNTED TO $2,500,000,000, PRODUCED BY 35,000 EMPLOYEES.

C-26: Setting Half-Diamond Indentations

Half-diamond is used widely in headings for newspapers, display posters and advertising matter with the idea of attracting the attention of the reader by giving the important part of the information and thus hoping that he will read the balance of the material.

This style of indentation is also used widely in job work, book title pages, formal announcements, tickets and many other types of display work.

Usually the first line is set full length and each successive line is indented in accordance with the rules set forth in the lesson on indentations.

But here again in many cases it is necessary to use personal judgment in order to set the material in such a form as to give a pleasing appearance to the sides of the half-diamond as it would not look well to have either too steep
or too sloping sides.

In many localities the half-diamond is also called the inverted pyramid.

Set the following copy 16 ems wide and indent each line the proper space according to the rules set forth in indentations:

The first colonial printer was Steven Daye. He began his work in Cambridge, Conn., in 1638. The Freeman's oath was the first product of the Daye press.

C-27: Setting Poetry Indentations

The rules for the indentation of poetry are not, in many cases, fixed rules as are the previous rules on indentations. They are set by the author through the style of verse and the rhythm arrangement of the lines.

Since most poetry does not fill a full line, as do regular paragraphs, the body of the poem should be centered in the column or page. To do this, take an average-length line, and center it in the desired measure. The number of ems required on either side will be the number by which each line should be indented. When centering indent only to the nearest en quad; trying to center any closer will lead to the use of too many small spaces. Any extra space will be put at the end of the line. By taking an average-length line an exceptionally long line will not be used and thus will not throw the poem
off the center of the page. These longer lines will be set on the next line.

Lines that rhyme are usually set with equal indentation, Example A. Lines too long for the measure used are called overrun and are indented 1-em more than the most heavily indented line. The depth of the indentation for lines that rhyme and lines that overrun are governed by the same rules as given in the unit on indentation. Thus in a line of poetry 22 picas wide, the lines that rhyme would be indented \( \frac{1}{2} \)-ems more than the number of ems required to center the poem in the page; and the overrun would be indented \( \frac{1}{2} \)-ems more than the most heavily indented line, Example B. If successive lines rhyme, they usually are not indented, Example C.

**Example A.**

God grant that I may live upon this earth
And face the tasks which every morning brings,
And never lose the glory and the worth
Of humble service and the simple things.

—Edgar A. Guest

**Example B.**

A pale sun glints across the swirling drifts,
Bent trees are crackling with a silver load,
A wild gale shrieks in mischief as it lifts
A stringing screen of flakes across the road.

—Edva Mead

**Example C.**

All the chimneys in our town
Wake from death when cold comes down.
Through the summer against the sky
Tall and silent and stark they lie;
But every chimney in our town
Starts to breathe when the cold comes down.

—Coningsby Dawson
Two verses showing unusual styles of indentation are shown in Examples D and E.

Example D

A larger kindness give to me,
A deeper love and sympathy,
Then O, one day
May someone say—
Remembering a lessoned pain;
"Would she pass this way again."

-Eva Rose York

Example E

You may know the fellow
Who thinks he thinks,
Or the fellow who thinks he knows;
But find the fellow
Who knows he thinks—
And you know the fellow who knows.

-Creswell McLaughlin

When quotation marks appear in poetry, they must extend into the margin so that they will not disturb the vertical alignment of the left-hand side of the lines. In order that such a problem will not be complicating to the compositor all punctuation marks are on a body size equivalent to that of the 4-em space or 25 per cent of an em quad. If a line starts with quotation marks and the normal indentation for the line is a 2-em quad or 200 per cent, then an em quad, 100 per cent, an en quad, 50 per cent, and two quotation marks, 25 per cent each would total 200 per cent and bring the first letter of the line into vertical alignment, Example F.

Example F

"Could every time-worn heart but see Thee once again,
A happy human child among the homes of men,
The age of doubt would pass, the vision of Thy face
Would silently restore the childhood of the race."
Verses or stanzas should be set apart with more space between them. If leads are used between lines then slugs should be used between verses.

When quotation marks occur within quotation marks and appear at the beginning of any line, allowance must be made for the additional marks to extend into the margin, Example G.

Example G

"Adam and Eve came back to Earth,
To see the latest designs by Worth,
'Adam,' said Eve, 'Adam, dear
There's not much change
Since we were here.'"

When the author's name is known and does not appear at the head of the poem, it should appear at the end of the right side, usually in italics. A large majority of poetry is set in italics.

Set your name and period 17 picas wide, flush on each end of the line. Set the copy below using the rules given above to center the poetry in the column and to determine the indentations:

"Whether we climb, whether we plod,
Space for one task the scant years lend—
To choose some path that leads to God,
And keep it to the end."

Set the following copy 12 picas wide using the rules stated above to determine the indentations:

"Let me carry your pail, my dear,
Brimming over with water.
'No! I'll take hold and you take hold,
Answered the farmer's daughter."

"And now they're at the eve of life,
While the Western skies grow brighter;"
For she took hold, and he took hold,
And it made the burden lighter."

C-28: Letter-spacing

When words appear to be falling apart, spaces should be inserted between letters to give the words an even appearance; this is called letter-spacing. Letter-spacing is most commonly used in lines set in capital letters and in larger sizes of type set for display matter.

Lower-case letters, if it is possible to avoid it, should not be letter-spaced. When one is setting short measure in which two 3-em spaces between words will not justify the line, it is necessary to letter-space words. When letter-spacing, the entire word, not just a part of it, must be spaced.

Example A. Letter-spacing can be avoided in many cases by running back or overrunning a few lines.

<table>
<thead>
<tr>
<th>Letter-spaced correctly</th>
<th>Letter-spaced incorrectly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct, words letter-spaced throughout; incorrect, words partially letter-spaced.</td>
<td></td>
</tr>
</tbody>
</table>

Example A

This uneven appearance in words set in capitals is caused by such letters as A, V, and W, which have slanting stems appearing side by side, or by such letters as F, J, P, and T which have large amounts of white space. This appearance of uneveness should be corrected by letter-spacing the word until it appears to the eye to be spaced evenly.

Example B. The larger the size of type, the more space necessary between letters.
Example B. Results when a word is letter-spaced properly

When lines are letter-spaced it is necessary to increase the size of the spaces used between words so that they are legible and do not appear to be crowded, Example C.

Example C. The effect of improper and proper word-spacing

To avoid these unsightly conditions when possible, the type-founders in larger sizes of type have cast the letters with excessive amounts of white space with mortised corners to allow these letters to be set together, Example D.

Example D. Unmortised letters Mortised letters

In the smaller size of type, 6 to 1\(\frac{1}{4}\) point, \(\frac{1}{2}\)-point copper and 1-point brass spaces will be sufficient to letter-space most lines of type properly. As the size of the type increases, the thickness of the spaces should increase to 2-point spaces, combination of 2-point spaces, 6-point, combination of 2-point, and 6-point spaces, and in the larger poster and headline types, even to pica slug.

Set the following copy 19 ems wide, using a slug under the head and leads between lines. Letter-space the heading
according to the rules given above. Use the \( \frac{1}{2} \)- and 1-point spaces found in the special case. After you have completed the lesson, return the thin spaces to the special case so they may be used by other students.

**PRINTING, THE ART PRESERVATIVE**

"How much knowledge would survive the discovery, if it were not for our art of printing. Knowledge is the chief asset of civilization. It is in our keeping. You are the torch bearers. Lift up your hands, O Printer!" — Henry Lewis

C-29: Piecing Leads and Other Spacing Materials

In setting long measures of type, or when a certain length of spacing materials runs low, it is necessary to combine different lengths of these materials to secure sufficient spacing materials to complete the job.

In combining materials a short and long measure should be used, and the breaks in the joints should be alternated so as not to weaken the type form. Whenever possible, it is wise to place a full length of spacing material at the top and bottom of the job. Whenever a partial amount of full length spacing materials is available, do not use all the full length materials at the beginning, but space them evenly throughout the type to be set. These precautions add to the rigidity of the type form and increase the ease with which it can be handled. Examples A, B and C indicate the right and wrong ways to piece spacing materials. The hair-line rules indicate where the spacing materials break, and the 6-point
rule at the top and bottom indicates where slugs or reglets are used.

<table>
<thead>
<tr>
<th>Example A. Wrong way to piece spacing materials</th>
<th>Example B. Right way to piece spacing materials</th>
</tr>
</thead>
</table>

As space is added between words to make them easier to read, so space is added between lines to make the page easier to read. The lighter the face, the less will be the space which is needed between lines; and the heavier the face and the larger the type size, the greater will be the space which is needed between lines.

BENJAMIN FRANKLIN, PRINTER, (1706-1790)


Example C. Shows increased space between head and body, and between the lines to counterbalance the increased size and weight of type face.

C-30: Lining Leaders with Figures

Leaders are a series of dots ( . . . . ) or dashes ( - - - - ) on one body, which are designed to aid the eye in following across the line where the materials at both
ends of the line are related but do not fill a full line.

Leaders come in two styles, dots and dashes. The dashes are usually used where it is desired to write on the lines. Leaders come in four body sizes, en, em, 2-em, and 3-em, so that they will line easily with figures or Roman numerals.

Figures and Roman numerals are cast on a body the same size as the en-quad, and the punctuation marks on the same size as a 4-em space. These even body sizes make it much simpler to align figures and leaders. In a few cases where the figures and Roman numerals are not cast on bodies the same size as an en-quad, it will be found that they are on body sizes or combinations of body sizes of the space system.

When using leaders, an en-quad is used between the right-hand end of the leader and the widest figure, and all the other leaders are aligned at the right-hand end of the leaders. Thus if the widest number consists of five figures with an en-quad in front of it, and the next line below has only two figures, it will take four en-quad to fill the space in front of the two figures so that the last leader dot will align vertically with the last leader dot in the line above it. Four en-quad is the equal of 200 per cent, so a 2-em quad will fill the space of the four en-quad and save handling the four en-quad.

In justification of this type of line the additional space is added between the last word on the left-hand side and the leaders; but, if more than an en-quad is needed to
justify the line, another leader is added and the line is then justified between the last word and the first leader. The space after the last word does not necessarily need to be an en-quads, but this space should not vary too widely; this space should appear fairly even. This can be done by adjusting the spacing between words at the beginning of the line.

<table>
<thead>
<tr>
<th>Balance on hand Jan. 1, 1947</th>
<th>$148.62</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance on hand Jan. 1, 1947</td>
<td>$148.65</td>
</tr>
</tbody>
</table>

Example A. The top line shows the wrong spacing, and the second line shows the correct spacing.

When a column of figures is to be totaled, a line appears underneath the last figure. This line is made by selecting a rule of sufficient weight to harmonize with the typeface being used. Next the width of the longest row of figures is measured, and a rule secured which is the same length, or the next shorter length, measured to the nearest half pica. Subtract the length of this rule from the total width of the column being set, and insert a lead that length in front of the rule to fill in the line.

<table>
<thead>
<tr>
<th>Balance on hand Jan. 1, 1947</th>
<th>$143.62</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received from membership fees</td>
<td>72.00</td>
</tr>
<tr>
<td>Received from subscriptions</td>
<td>9.75</td>
</tr>
<tr>
<td>Miscellaneous receipts</td>
<td>.87</td>
</tr>
<tr>
<td>Received from advertising</td>
<td>134.68</td>
</tr>
<tr>
<td>Total receipts</td>
<td>$361.92</td>
</tr>
</tbody>
</table>

Example B. Proper method of setting figures and leaders. Both ends of the lines are indented to shorten the length of the leader lines and give unity to the table.
Leaders are supposed to give the effect of drawing the materials on the ends of the lines together, as well as for ease in reading. When lines of leaders are too long, their very purpose is defeated. In that case the length of the leader lines can be shortened by indenting each end of the line the same measure of ems (Example B); or doubling up into two or more columns (Example C).

<table>
<thead>
<tr>
<th>Reserved seats</th>
<th>$2.50</th>
<th>Registration</th>
<th>8:30 A.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General admission</td>
<td>1.50</td>
<td>Opening Session</td>
<td>9:00 A.M.</td>
</tr>
<tr>
<td>Servicemen</td>
<td>1.00</td>
<td>General meeting</td>
<td>1:00 P.M.</td>
</tr>
<tr>
<td>Children</td>
<td>.75</td>
<td>Closing Session</td>
<td>3:00 P.M.</td>
</tr>
</tbody>
</table>

Example C. Method of setting short lines in two columns to shorten the length of the leader lines needed.

In early forms of printing periods or hyphens spaced out with em quads were used to help the eyes follow across the open space in the lines. This same method is used today in posters and other forms of printing where larger sizes of type are used, Examples D and E.

<table>
<thead>
<tr>
<th>W.</th>
<th>L.</th>
<th>Perc.</th>
<th>W.</th>
<th>L.</th>
<th>Perc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notre Dame</td>
<td>10</td>
<td>0</td>
<td>1.000</td>
<td>Rice</td>
<td>5</td>
</tr>
<tr>
<td>Army</td>
<td>9</td>
<td>1</td>
<td>.900</td>
<td>Marquette</td>
<td>5</td>
</tr>
<tr>
<td>Michigan</td>
<td>8</td>
<td>2</td>
<td>.800</td>
<td>Brown</td>
<td>4</td>
</tr>
<tr>
<td>Ohio State</td>
<td>7</td>
<td>3</td>
<td>.727</td>
<td>Nebraska</td>
<td>3</td>
</tr>
<tr>
<td>Purdue</td>
<td>6</td>
<td>3</td>
<td>.667</td>
<td>Temple</td>
<td>1</td>
</tr>
</tbody>
</table>

Example D. Periods used to aid eyes. Example E. Hyphens used to aid eyes.
Set the following 18 ems wide using the rules given above.

SENIOR CLASS FINANCES

Received from Senior Dance, $76.50
Received from class dues, $164.00
Received from class play, $83.92
Received from sale of jewelry, $127.41
Miscellaneous receipts, $9.53
Total receipts, $461.36

C-31: Lining Roman Numerals

When the Romans adopted eighteen letters of the Greek alphabet and developed their twenty-four letter alphabet, they also developed the system of numbering which used letters of the alphabet instead of the Arabic system of separate and different characters. Although the Arabic is the numbering system most commonly used by the English-speaking peoples, there are places where Roman numerals are used to good advantage. Example A shows the method of writing Roman numerals from one to one thousand.

<table>
<thead>
<tr>
<th>Roman Numeral</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>2</td>
</tr>
<tr>
<td>III</td>
<td>3</td>
</tr>
<tr>
<td>IV</td>
<td>4</td>
</tr>
<tr>
<td>V</td>
<td>5</td>
</tr>
<tr>
<td>VI</td>
<td>6</td>
</tr>
<tr>
<td>VII</td>
<td>7</td>
</tr>
<tr>
<td>VIII</td>
<td>8</td>
</tr>
<tr>
<td>IX</td>
<td>9</td>
</tr>
<tr>
<td>X</td>
<td>10</td>
</tr>
<tr>
<td>XI</td>
<td>11</td>
</tr>
<tr>
<td>XII</td>
<td>12</td>
</tr>
<tr>
<td>XIII</td>
<td>13</td>
</tr>
<tr>
<td>XIV</td>
<td>14</td>
</tr>
<tr>
<td>XV</td>
<td>15</td>
</tr>
<tr>
<td>XVI</td>
<td>16</td>
</tr>
<tr>
<td>XVII</td>
<td>17</td>
</tr>
<tr>
<td>XVIII</td>
<td>18</td>
</tr>
<tr>
<td>XIX</td>
<td>19</td>
</tr>
<tr>
<td>XX</td>
<td>20</td>
</tr>
<tr>
<td>XXX</td>
<td>30</td>
</tr>
<tr>
<td>XL</td>
<td>40</td>
</tr>
<tr>
<td>L</td>
<td>50</td>
</tr>
<tr>
<td>LX</td>
<td>60</td>
</tr>
<tr>
<td>LXX</td>
<td>70</td>
</tr>
<tr>
<td>LXXX</td>
<td>80</td>
</tr>
<tr>
<td>XC</td>
<td>90</td>
</tr>
<tr>
<td>C</td>
<td>100</td>
</tr>
<tr>
<td>D</td>
<td>500</td>
</tr>
<tr>
<td>M</td>
<td>1000</td>
</tr>
</tbody>
</table>

Example A. Table of Roman numerals

Capital Roman numerals may be used as publication dates on the frontispiece of books, as chapter headings, for sections of outlines, in tabular matter, and for acts of plays. When used for pages in the preface or introduction of books the
Roman numerals are used in the lower-case form.

When Roman or Arabic numerals are used in tabular form, the numbers are usually centered. When used in outline form or in tabular matter, they should be aligned on the right side. All the capitals of the alphabet, which are used as Roman numerals, are cast on the standard-space sizes to aid in alignment.

When Roman or Arabic numerals are used in tabular form, the numbers are centered under the heading designating what each column of figures indicates. Example A. The use of Roman and Arabic numerals in tabular form.

### HISTORY OF WORLD WAR II

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>9</td>
</tr>
<tr>
<td>XVI</td>
<td>83</td>
</tr>
<tr>
<td>LXII</td>
<td>247</td>
</tr>
<tr>
<td>CXL</td>
<td>956</td>
</tr>
<tr>
<td>DLXX</td>
<td>1365</td>
</tr>
</tbody>
</table>

Example A. Proper use of Roman and Arabic numerals in tabular form.

Set the following 16 ems wide using the rules given above.

### THE HISTORY OF PRINTING

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>521</td>
<td>1294</td>
</tr>
<tr>
<td>17</td>
<td>76</td>
</tr>
<tr>
<td>61</td>
<td>152</td>
</tr>
<tr>
<td>125</td>
<td>384</td>
</tr>
</tbody>
</table>
C-32: Setting Multiple Justifications

When more than one column of material is to be aligned vertically, this alignment can be made in a single measure by the method known as multiple justification.

To align columns by the multiple justification method, determine the width which each separate column is to be set. The total of these columns will be the overall length the material should be set. Now secure a pica reglet the length of the last column, another the width of the last two columns and so on until you have a reglet combination for every combination of column to be set, except the first column. Place the longest reglet in the right hand side of the stick, and set and justify the type against the end of the reglet. Now remove the longest reglet and place whatever space necessary between columns, then set and justify the second column against the second longest reglet. Repeat this process until all the columns have been set. Example A illustrates the above method.

Example A. One method of setting multiple justification

It is also possible to set multiple columns of figures in one stick even when vertical rules are to be inserted between the columns. To do this each column must contain a
uniform width in figures and spaces so that it will be easy
to separate each column from the one next to it. After the
width of each column is figured, determine the width to set
the stick to take care of all columns, being sure to allow
sufficient width to accommodate the number of rules which will
be inserted. This is done by placing the number of rules
necessary in the left-hand side of the stick and justifying
the lines against these rules. After the type has been set,
place it in a galley, separate the columns at the proper
places and insert the rules. Example B and Example C with
rules inserted between columns.

TIME TABLE

<table>
<thead>
<tr>
<th>Flight Numbers</th>
<th>2</th>
<th>4</th>
<th>7</th>
<th>9</th>
<th>15</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A.M.</td>
<td>A.M.</td>
<td>A.M.</td>
<td>P.M.</td>
<td>P.M.</td>
<td>P.M.</td>
</tr>
<tr>
<td>New York</td>
<td>2:03</td>
<td>5:45</td>
<td>11:05</td>
<td>2:30</td>
<td>6:38</td>
<td>10:18</td>
</tr>
<tr>
<td>Buffalo</td>
<td>3:13</td>
<td>6:37</td>
<td>12:26</td>
<td>4:08</td>
<td>7:11</td>
<td>11:53</td>
</tr>
<tr>
<td>Detroit</td>
<td>4:21</td>
<td>7:54</td>
<td>1:14</td>
<td>5:17</td>
<td>9:36</td>
<td>1:47</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>3:19</td>
<td>7:34</td>
<td>12:28</td>
<td>4:41</td>
<td>8:26</td>
<td>12:07</td>
</tr>
</tbody>
</table>

Example B. Figures set with rules at left of stick

TIME TABLE

<table>
<thead>
<tr>
<th>Flight Numbers</th>
<th>2</th>
<th>4</th>
<th>7</th>
<th>9</th>
<th>15</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A.M.</td>
<td>A.M.</td>
<td>A.M.</td>
<td>P.M.</td>
<td>P.M.</td>
<td>P.M.</td>
</tr>
<tr>
<td>New York</td>
<td>2:03</td>
<td>5:45</td>
<td>11:05</td>
<td>2:30</td>
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</tr>
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<td>Detroit</td>
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<td>1:14</td>
<td>5:17</td>
<td>9:36</td>
<td>1:47</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>3:19</td>
<td>7:34</td>
<td>12:28</td>
<td>4:41</td>
<td>8:26</td>
<td>12:07</td>
</tr>
</tbody>
</table>

Example C. Figures with rules inserted.
Sometimes it is necessary to center a heading in a line with irregular lengths of material on each end of the line. Example D.

Vol. 10 The Quarterly No. 4

Example D. Centering heading with other material in line

To be sure that the heading is centered, first center The Quarterly in the desired measure, then remove sufficient quads on the right-hand end of the stick and set Vol. 10 and rejustify the line, then remove sufficient quads on the left-hand end of the stick and set No. 4 and justify the line, in this manner the centered material is not moved out of the mathematical center of the line.

Imposition:

I-1: Spacing Out a Form

When type is being set, no attempt is made to space out the form. Only leads are placed between lines and when the stick is full, the type is placed on a galley. This is repeated until all the type for the job is set. After the type is read and corrected, the next step is to insert space between the lines where necessary so that the type form covers a given space and is easy to read and pleasing to the eye. Placing space between the lines to achieve these ends is called spacing out the form.

The various rules that you have already learned about indentation for the beginning of paragraphs, space between words and sentences, and space between paragraphs have all
been rules which if followed make the type pleasing to the eye and easy to read.

Each job that is being spaced presents a different problem. The materials in the form should be so spaced that closely related information is grouped, and so that the eye pauses naturally at the end of each such grouping.

When the type is neither crowded nor spaced so widely that there are unsightly white spaces between words, it is said to be pleasing to the eye.

Achieving this pleasing effect requires a great deal of observation as to how other compositors have secured a good looking piece of printing. Take notice of how pages of books, programs and posters are spaced to attract the eye.

After a form is spaced out and a proof has been taken, it may be seen that a certain section is not spaced properly, or that the type used for some section is too large or too small. Make the changes which you think will improve the layout. Compare a second proof with the first proof, and notice the change. If the result is not just what is desired, make further changes until the desired effect is secured.

After the form is spaced out, tie it up until you are ready to lock it up.

I-2: Locking Up a Form

When the type form has been ok'ed, and is ready to be printed, it is placed on the imposition table to be locked for the press. The imposition table is a heavy table or
cabinet with a smooth metal surface. In earlier times a smooth marble slab was used for lock-up. From this fact the imposition table was given the name stone, which is still widely used. The person who makes the form ready for the press is called a stoneman or lock-up man.

Slide the tied form onto the stone from the galley on which it was spaced out. Next determine the size of the press on which the form is to be printed and secure a chase to fit that size press. A chase is a metal frame which fits snugly into the press and in which the type is secured for printing. The top of the chase is the side away from the person locking the form, and in some shops the top of the chase is painted red to aid the student in placing the chase in the press in the proper position. The size of a press is designated by the size of the chase that it takes. The size of the chase is determined by the inside dimensions of the chase. The more popular platen press sizes are 8" x 12", 10" x 15", 12" x 18", and 14" x 22".

If the form is to be printed on a piece of paper with about equal margins, the form is centered in the chase from side to side and slightly above the center from top to bottom for the convenience of the press feeder. If the width of the form is wider than the form is long, then the head of the form is placed towards the bottom of the chase. However, if the form is longer than it is wide, the head is placed to the left side of the chase. The forms are locked
in these positions so that they are more easily read by the pressman as he feeds the press. It is his responsibility to see that the impression remains satisfactory, that work-ups do not occur, that letters do not come loose and pull out, and that the ink is kept constant.

There are exceptions to the rule that forms are locked in the center of the chase from side to side. Whenever the form covers only part of the sheet of paper, the form is positioned in the chase so that the sheet will be fed into the center of the press. This is done for the convenience of the pressfeeder. Other exceptions will be dealt with later.

After the form has been positioned in the chase, furniture is placed on all sides of the form. Furniture is wooden blocks cut to accurate pica sizes. It comes in fonts of assorted sizes. There are two popular font arrangements, one in graduations of 5 or 10 pica lengths, from 10 to 60 picas, and the other in graduations of 6 picas from 12 to 60 picas. Both these furniture fonts come in assorted widths of 2, 3, 4, 5, 6, 8 and 10 picas. The 4-pica piece is not quite square, so a groove is run down the 4-pica side. This piece should always be placed in the form with the groove up or down.

When the length of the lines in the form is the same as that of a standard furniture length, only two lengths will be required for the lock-up.
Fill in the space between the head of the form and the bottom of the chase and between the left-hand side of the form and the left-hand end of the chase. Now place pieces of furniture, 8- or 10-picas wide, against the top side and the right-hand side of the form and remove the string. Next to these pieces of furniture are placed the quoins (pronounced coins). Quoins are mechanical devices which when tightened hold the form securely in the chase for printing. The balance of the space between the quoins and the side of the chase is filled in to the nearest pica with furniture. Place a 6-point reglet on each side of the quoins to prevent damage to the sides of the furniture.

Now tighten the quoins with the quoin key, checking to see that the form locks squarely and does not bind. Before planing the form, lift it and wipe the back as well as the stone, as any small particle of grit on the back of the form will cause the letters to punch into the paper when the impression is taken.

Unlock the form and retighten the quoins until the form is snug, but yet not tight enough to lift; then plane down the form. Be sure to hold the planer square with the surface of the type. For a small form the planes should be tapped lightly, and for a larger form an increasing amount of force should be used. Never attempt to beat the letters into place. The form should be loose enough to allow all type to seat itself without having to pound the form. After the form has
been planed, tighten the quoins a second time until the quoins hold the form snugly. Raise the corner of the form and slip key under the edge. Now run a finger lightly over the lines to test them; it is not necessary to punch the type to see if it is tight.

Until you are ready to put the form on the press, place it in the chase rack with the red side of the chase up and the face of the type to the right.

Presswork:

1. Putting the Job on the Press

The person who puts the job on a press is called a pressman. The first duty of the pressman is to check the job envelope or ticket to secure the following information, (1) the type of job, (2) the press on which it is to be run, (3) size and kind of stock, (4) color of ink, (5) number of run, (6) any special information about the job.

Before applying the ink make sure the press is clean, then apply a small quantity of ink (not to exceed the size of a pea) to the left side of the disc. Always run up the ink before placing the form on the press, as the ink, before it is distributed, will fill in such letters as e's, a's and o's. Remember, it is always easier to add more ink than to wash the press to take off the excess ink. In inking the press be sure that you are using the proper ink for the job, as different types of jobs and papers require different kinds of ink. A few of the inks to select from are job, book, half-tone, bond and cover.
After the ink has been run up, remove the chase from the chase rack and place it on the press. A light form may be placed on the press over the delivery board, but a heavy form should be placed on the press from the right hand to prevent straining the back or dropping and damaging the form.

Now that the form is on the press, the first thing to do is to remove the gauge pins and spread the grippers to clear the new form. The gauge pins are metal guides which are set into the top sheet on the press to give the desired margins. Grippers are the metal fingers which are set to clear the type face and which help to pull the printed sheet of paper off the type form as the press opens.

Before printing or pulling an impression on the top sheet or tympan, be sure it is not damaged where the new form will print; if it is damaged put on a new tympan or dress the platen. It is also necessary to see that there is not too much packing under the tympan. You will soon learn that a heavy form takes much more packing than a light form. For this reason it is easier to start with a light packing and add a little packing at a time until the proper impression is reached, than it is to pull the impression of a light form on a heavy packing and batter the face of the type so that it does not print evenly when placed with other type from that type font.

The next step is to establish the margins for the job. There are several methods. Probably the most satisfactory,
where the margins for the top and bottom and the sides will be the same, is to measure the length of the type form and the length of the paper and subtract the length of the form from the length of the paper. This will give you the amount of space that will be left for margins both top and bottom. Divide this by two and this will give the margins for the top and bottom. Repeat this process to secure the margins for each side.

Now draw a line the distance you have determined along the bottom and left-hand side of the form. Three pins are used as guides on the tympan to which the sheet is fed. Two of these pins are placed along the bottom edge of the form, one about half way between the left-hand corner and the center of the side of the form and the second almost to the right-hand end of the form. The third pin is placed about half way up the left-hand side of the form. The point of the pins is inserted in the tympan one-fourth of an inch below the margin line and are pushed in until the feed edge of the pins is square with the line. Be sure that the spring tongues do not extend out into the form or they will smash the type. These tongues help hold the paper square to the pins and to strip the paper from the form after it has been printed.

Place a sheet to the pins and pull a proof. Measure the margins to see that they are square. Then tap the pins lightly to seat the pins into the tympan so they will not slip as the sheets of stock are inserted against them.
When you are satisfied that everything is ready to print show the final proof to the instructor for an ok and then the job is ready to be run.

P-2: Feeding the Press

Whenever possible it is recommended that the student learn to feed press on a handlever press rather than a power press. The procedure of picking up the sheets, feeding it to the guides, and removing it from the platen are just the same as in a power fed press. The student is not frightened by a fast moving machine over which he has little control. The only new procedure he will have to learn when he changes to a power press is the use of the impression lever.

When feeding press place on the feed board only the amount which will be placed in the drying rack at one time. Before starting to feed press take the pile and fan out the paper to make the sheets easier to pick up. Leave the pile in a slightly sloping manner so that each sheet hangs slightly over the one below it.

Pick up the papers by placing the finger of the right hand lightly on the top sheet and dragging the sheet towards the press, at the same time lift the edge with the thumb. Place the sheet down on the two bottom guides about an inch from the left hand guide and remove the thumb from under the sheet. Continue to drag the fingers lightly over the sheet until the sheet hits the left hand guide. Then remove the right hand from the press. A few drops of glycerine on a
piece of cotton used to dampen the finger tips will aid in picking up the sheets of paper.

Grasp the lever with the left hand and pull it in a full even stroke. Return the lever to its proper place; do not allow it to return with a thud. While you are pulling the lever with the left hand return the right hand to the pile and pick up the next sheet of paper so you will be ready to insert it as soon as the printed sheet has been removed. To aid in removing the printed sheet from the press, and to prevent the finger from smearing the fresh ink, the press feeder wears a sandpaper strip or stall on the middle finger. The feeder uses only the middle and thumb to remove the printed sheet from the press.

At first it will seem more efficient for the student to pull the lever with the left hand and put the sheet in and take it out with the right hand, but this is not correct as the student does not acquire the skill and coordination necessary to feed the power driven press. Also do not allow another person to pull the lever in order to speed up the printing, as this is a very dangerous procedure and can result in a badly pinched hand.

Many students seem to think that the only duty of a pressfeeder is to put sheets of paper in and out of a press. The following are a few of his other duties. He must see that the ink does not run too light or too heavy. He must see that work-ups do not occur in the form, or that letters
become loose and fall out leaving the printed form incomplete. He must see that the stock fed into the press is clean and that the printed stock is piled in the drying rack in small enough quantities so that it does not offset. He must see that the proper number is printed.

As the ink runs light a small quantity should be spread out on the disk and the lever pulled until the ink is worked out smooth and even. On a lever press it is necessary to remove the form from the press to run up the ink as the form prints on the tympan everytime the lever is pulled and causes an offset on the backs of the printed sheet.

**Bindery:**

**B-1: Cutting Stock**

Most of the paper used today is made from wood pulp, but some of the more expensive writing papers are made in part or altogether from cotton and linen rags. There are many finishes and grades of paper, but most of them can be classified under five general headings: news, book papers, writing paper, covers, and cardboards. As has already been noted these various finishes of paper require different kinds of ink. Most paper comes from the mills in standard sizes suitable for the various uses to which that type of paper is usually put. The paper is most commonly packaged in 100, 250, or 500 sheets depending on the kind and weight.

After the student arrives at the size of the paper for any job, the next step is to choose the kind of paper that
best fits the job, find out the sizes in which it comes and
the number of sheets that can be cut from the mill size.

In figuring stock it is not possible, as so many try, to
figure the number of square inches in the job to be printed
and the number of square inches in the mill size sheet divid-
ing one into the other to determine the number of sheets that
can be obtained. The error in this calculation lies in the
fact that a sheet of paper cannot be stretched one way and
squeezed another. It is only possible to cut so many pieces
of paper out of a given size. The pieces that are not the
proper size are called off cuts, and cannot be used for that
size job.

In cutting stock it is necessary to figure how many
pieces of stock can be cut both ways from a mill size sheet.
The following illustrates that by figuring the cut two ways
it is possible to get two more sheets one way that the other.

\[
\begin{align*}
\frac{11}{2}'' \times \frac{11}{2}'' &= \frac{5}{4}'' \times \frac{5}{4}'' \\
\frac{17}{2}'' \times 22'' &= \frac{17}{2}'' \times 22'' \\
3 \times 2 &= 6 \text{ out} & 2 \times 4 &= 8 \text{ out}
\end{align*}
\]

When determining the paper needed, the stock should be
figured both ways and it is sometimes possible to secure
additional pieces out of the off cut. After it has been
determined the number of pieces that can be cut from one
sheet divide this number into the total sheets desired to
find the number of mill sheets necessary for the job. It is
necessary to add a few extra sheets to allow for spoilage in
make-ready and press feeding. This number varies from shop
to shop but the following amounts are about average. In runs
up to 250 add 10 per cent, 250 to 1,000 add 5 per cent, 1,000
to 10,000 add 4 per cent and over 10,000 add 3 per cent. In
color work double the above percentages.

Let us suppose that the above described job calls for
1,000 5½" x 8½" letterheads. The following illustrates the
method of arriving at the number of mill sheets necessary for
the job.

\[
\begin{align*}
1,000 & \times 40 = 40 \text{ pieces for spoilage} \\
1,000 & \times 40 = 10,400 \text{ pieces of } 5\frac{1}{2}\" \times 8\frac{1}{2}\" \text{ necessary} \\
& \text{for the job} \\
8 & \text{ pieces of } 5\frac{1}{2}\" \times 8\frac{1}{2}\" \text{ can be cut out of the} \\
& \text{ mill sheet } 17\" \times 22\" \\
10,400 & \div 8 = 130 \text{ sheets required for the job.}
\end{align*}
\]

B-2: Caring for Printed Stock

After the stock is cut, it is piled on the stock table
or drying cabinet adjacent to the presses. Most shops have
a drying cabinet or drying rack which consists of a number
of drawers or shelves on which printed stock is piled until
the ink has had time to dry.

As stated in an earlier lesson only the amount which
is piled in the drying rack at one time is placed on the
feedboard of the press. In placing the printed stock in the
drawers do not pile so much in a stack that the weight will
cause the wet ink on the sheet below to offset on the back
of the sheet above.

In handling printed stock do not attempt to jog the
printed sheets into an even pile, or place any undue
pressure on the pile as any movement is inclined to blur
the printed area or cause it to offset.
After the printed materials have remained in the rack overnight it is sufficiently dry to print on the other side, if that is to be done; to receive any further processing which may be necessary; or to be packaged for deliver. Careful handling of the printed job has much to do with the neat appearance of the finished job.

B-3: Padding Printed Stock

One of the most common processes in bindery operations is the securing of loose sheets of paper or printed forms into compact groups or pads. This process is called padding.

After the ink on the printed stock is dry the next step in padding is to determine the number of sheets that each pad should contain. Each pad has a back of heavy cardboard or chipboard to add firmness for writing ease. Divide the number of sheets desired in each pad by the total number of sheets in the job. This will determine the number of backs which will need to be cut.

Take the printed stock and jog them into a neat pile. There are two ways of securing the approximate number of sheets desired in a pad. Count out the desired number of sheets and mark them check pile. Place in a pile next to the check pile, as near as possible, the same number of sheets as are in the check pile. Run the finger over the edge of the two piles and add to or take away from the second pile until it seems to have the same number of sheets. Most shops have an adjustable pad counter which is made of two
flat blades, one of which is adjustable to any distance from the other blade. To use the pad counter, count out the number of sheets desired in each pad and add five extra sheets to allow for the snug fit when setting the gauge. Loosen the one blade and place the counted pile between the two blades and tighten the blade into place. Remove the extra five sheets from the counted pile. Now if the fixed blade is placed squarely on the top of the pile of stock and a firm pressure is applied as the adjustable blade is slid into the pile, the counter will pick up approximately the number desired.

As each pad is stabbed off the pile place a cardboard on the back of each pad. When all the stock is divided in pads the next step is to secure a padding rack, clamp, shears, super cloth and padding compound. The padding rack is usually a 90 degree V-shaped trough in which the pads can be jogged to the head to secure a smooth surface on which to apply the padding compound. Before the pads are placed in the rack, take the number of pads that can be held loosely in the hand and jog or tap all the sheets down to a smooth head, allowing any irregularity to come at the foot of the pad. Place the pads head down in the rack. After the rack is full place a block of wood the size of the pad at the top and bottom of the pile and place a clamp over the entire pile; tighten the screw until the pile is squeezed into one firm pile which can be lifted from the rack without falling apart.
Most pads are only coated with a couple of layers of flexible padding compound. But if a more durable pad is desired a layer of starched cheese cloth, called super, is placed between the two coats of padding compound. This piece of super should be cut narrower than the width of the pad but should be long enough to cover the pads from the top to the bottom. Apply a coat of padding compound, brush from the center of the area to be padded to the edges. If the back is brushed across the width of the pad the compound is liable to run over the edges. This excess compound will make the sheets difficult to tear off. After the first coat of compound has been applied, place the super in the compound and apply a second coat. This backing will give a durable, and flexible back and should be dry enough to be cut into pads in several hours.

The pads are cut apart by placing a sharp knife flat between the backs of the top pad and the top sheet of the next pad. Cut the flexible back using a sawing motion, as it is difficult to pull a knife through the padding compound—it usually tears a number of the top sheets of the next pad if the cutting is not done in this manner. After the pads are cut apart, wrap them in convenient packages and paste on the outside a sample of the form and mark the quantity.

B-4: Binding Processes

In making such bindery projects as notebook covers, albums and memo pads there are a few processes which are
common to all the projects. Once these are mastered it is possible to make many interesting and useful bindery projects.

The major factor contributing to the success of bindery projects is the careful work-up of sketches of the project with the proper sizes for all the book fabric, chipboard, end sheets, and filler sheets.

Before cutting the cover boards, determine the desired size of the finished sheet. If the book is to have a hinged strap for binder posts allow an extra 3/4" along the back of the book for this type of binding. Thus for a 9" x 12" book one would cut two chipboards 9" x 12" and two hinges 3/4" x 12". Be sure to cut all chipboard squarely and cut the front and back the same size or the book will not make up squarely.

The fabric to cover these boards should lap over the top, bottom, and front edges 3/4" and over the hinge edge 1 1/2" so the fabric would be 9" + 3/4" + 3/4", or 10 1/2" for the width and 12" + 3/4" + 1 1/2", or 14 1/4" for the length.

The next step is to mark out on the inside of the book fabric the desired measurements so that after the paste is applied there will be no difficulty in locating the position for the chipboard after the paste is applied.

In applying paste to the parts that are to be put together be sure to brush the paste out evenly, as excess paste will dry in lumps under the fabric. Apply a thin even coat to both the fabric and the chipboard. Be sure not to leave any of the area without paste, as these areas will cause loose spots under the fabric which will wear through.
more easily. Apply the pasted chipboard to the area designated on the fabric and rub them smooth with a clean cloth.

In placing the hinge for the cover leave 1/8" between the two pieces of chipboard so as to allow the fabric to bend without cracking.

Before folding in the top and bottom fabric cut the corners off diagonal to the edges and 1/8" from the corner of the chipboard. Paste the edges and fold them in squarely to the edge of the chipboard. The 1 1/2" of fabric at the back of the cover is next pasted and folded over the hinge and onto the large piece of chipboard. Before the paste dries work a crease into both the inside and outside of the cover to allow the hinge to work freely.

Now select the color of end sheets which is desired and cut them 1/4" narrower and shorter than the large part of the cover, in this case 8 1/2" x 11 1/2". Paste the back of these sheets and apply them to the inside of the covers to cover the turned edges and give the book a finished look.

In a photo album the fillers for the book would be cut 1/4" narrower than the width of the book but 13 3/4" long; 7/8" of this sheet should be folded back on the sheet to act as fillers for the back to compensate for the picture which will be added in the book.

Punch three sets of holes in both the fillers and the cover so that the book can be tied or binder posts inserted
to hold the book together. In punching these holes be sure to allow for the difference in the width of the cover over the filler, so that the cover will have an even overhang around the edge of the cover. The back of the cover and the filler should be even.

Projects Sheets

Imprinting a Book Plate

A book plate is an artistic design which carries the name of the owner of the book. These plates are usually printed on gummed paper so that they will be easy to affix to the inside covers of books. Book plates can be secured in a large variety of designs.

In practically every line of work which you may follow in later life it is necessary either to have a job sheet to work from or to draw up a work sheet of your own. For this reason when doing projects it will be necessary for you to draw up a project sheet to give you a clear idea of what you are doing. Before you start to work have the project sheet checked over and ok'ed by the instructor. In this way the instructor can give you helpful suggestions and catch errors which you might not detect until the job is printed.

On this project sheet state the project name, write out the copy which is to be set, the length of the line, the kind and size of the type you have selected from those which the instructor has indicated as being for use in that particular project, the kind of paper, and the color of ink.
In selecting the type choose a face that harmonizes with the design of the book plate. Set the name you are to imprint in a measure which is a multiple of five, this is to simplify the locking up of the form. Center the name in the measure chosen, pull a proof and check it carefully for errors. Now lock-up the form as already taught and place it on the press and make it ready to print. Choose an ink which goes well with the color in the design, if it is in color; if not use a black ink. Strike the name imprint into the center of the area left for that purpose.

When the form is made ready to your satisfaction secure a final ok from the instructor. After the book plates are printed place them in the drying rack over night to allow them to dry properly. Paste a finished project on the project sheet and turn in for a grade.

Every home library should have book plates to establish the owner of the books when loaned. This project will make a nice gift for some member of the family.

Imprinting Christmas Cards

Of the many assortments of Christmas cards which are on the market only a few are put up with the idea that the purchaser may wish to have his name imprinted on the cards. In order to be satisfactory for imprinting the cards should be the same size and should have a fairly uniform margin on the right hand and bottom edges of page three, where the imprint is to be made.
In imprinting Christmas cards it is permissible when sending only to personal friends to use, Mary and Jack; the more formal style should be Mr. and Mrs. John Brown; if there are children in the family the personal would be, Mary, Jack, Betty, and Joe; and the formal Mr. and Mrs. John Brown and family, or less formal, The Browns. Do not use the short & in a personal signature.

After the assortment of cards has been chosen, make out a project sheet as described in Imprinting Book Plates and have it ok'ed by the instructor. Choose a type face and size which is the same size or harmonizes with the type used on the card. Set the type in a measure which is a multiple of five for ease in locking. Set the type flush on the right hand end of the line.

In locking the form remember that the card is to be fed open and in order to have the card feed more easily it will be necessary to lock the type in the lower right hand corner of the chase, but the card should still be in the center of the platen from side to side and slightly above the center from top to bottom.

Allow the cards to remain in the drying rack overnight before handling. Paste a finished project on the project sheet and turn in for a grade.

Printing a Personal Card

Personal cards come in two styles, a plain and a paneled card, and in antique, plate, and linen finish. Antique
is the most popular finish. Card sizes for social use are classified as Miss, Mrs., and Mr. and Mrs. The sizes of business cards are classified differently.

A personal card should contain nothing but the name, in the case of a man's card. In the case of a lady's card, Miss or Mrs. should precede the name. Such designations as Jr., Sr., or III, should be set off from the name with a comma.

In selecting a type choose a type which does not look large for the size of the card. The heavier the type face, the smaller should be the type size. Ten, twelve, and fourteen point are those most commonly used. It is a rare occasion when eighteen point can be used with good taste.

In spacing the name on a card, it should be centered from side to side, but should rest on a line drawn lengthwise through the center of the card; this is called the optical center. If the name is placed in the mathematical center, it would look low. This is due to the fact that the eyes see the white space above the name more prominently than that below the name. Due to this optical illusion, we say to print the card on the optical center not the mathematical center of the card.

Make out a project sheet with the required information and secure the instructor's ok. Center the type in the center of the line and lock it slightly above the center. Black ink is the only proper color to use for formal personal cards. Bond ink is the grade of ink to be used on
card stock, unless it is plate finish which requires job ink. Allow the cards to dry overnight in the drying rack before taking home. Paste a finished project on the project sheet and turn in for a grade.

Making a Memorandum Pad

Memorandum pads vary in size according to the desire of those having them made up. One of the most popular sizes is 3" x 5". Each sheet usually carries some type of a heading of the department or person from which it came, but in some cases only the word Memo.

On a project sheet draw a sketch for a memo pad, indicating the size of the sheet, the number in the pad, the heading for the sheets, and the kind and size of type to be used. Usually for this type of project eight or ten point type will be large enough. Figure out the way the stock will be cut from the size sheet you have selected. Show the project to the instructor for his ok.

Secure the sheets necessary to cut out the number of pads desired and cut the stock. Set up the type and print the headings on each sheet, allowing them to dry overnight. Cut cardboards for the backs and make up into the desired number of pads. Clamp in padding rack and apply padding compound and super to the heads, allowing the pads to dry overnight. Now cut the pads apart and the project is finished. Show the instructor a finished pad and paste a finished sample on a project sheet and turn in for a grade.
A little later when the student has finished his notebook project a nice project would be to make a holder for the memo pads.

Making a Telephone Pad

A handy form to have in a telephone stand is a telephone pad. There are many different forms but they contain the following information in one form or another.

_______ called at _____ time. Call number _____ at _____ time, or when possible. _____ took call.

The pad also should contain space on the bottom to write any message which might be left.

On a project sheet draw up a form which you would like for a telephone pad, determine the size and kind of type, length of line, size of sheet, and figure the stock required for the desired number. Secure the instructor's ok. Set the type, lock-up and print the form, allow to dry, and make-up into pads. Show the finished pads to the instructor and paste a finished sample on the project sheet and turn in for a grade.

Printing Personal Stationery

Almost everyone likes nice stationery and more and more people are coming to feel that an essential on stationery is the person's monogram, name, or name and address. Stationery which is printed is often referred to as personalized stationery.

Stationery reflects the good taste of the sender as
much as proper clothes reflect the good taste of the wearer. In selecting stationery one should consider the quality of the paper, as many papers are packaged to sell, that is they are put up in attractive boxes but the paper is a cheap grade for writing purposes. In selecting stationery always purchase as good a quality as can be purchased for the money which you wish to spend, rather than an attractive box. Remember, your friends do not see the box. Select a paper which is attractive in design and color, not gaudy and loud. When choosing a monogram or type for the printing, do not choose too large a monogram or type for the size of the sheet.

Monograms and single names are usually printed in the upper left hand corner of the sheet. Name and address appear in the top center of the sheet. Monograms usually come in 36, 48 and 60 point combinations. Single names or nick names may be set in type sizes from 18 to 48 point, depending on the length of the name, the weight of the type face and the size of the paper. When using type as a heading, the most popular form is to center the type 2½ to 3 picas from the top of the sheet. The lines should create a sense of balance by being set either in a diamond or half-diamond form. It is sometimes necessary to change the copy in order to give the heading a pleasing effect. The following examples illustrate this point.
In other cases the type may come out with the two top lines almost equal in length and when nothing can be done about the second line, the design can be made to look more pleasing in the following manner.

Example C. Top lines too near same length.
Example D. More pleasing effect.

It is sometimes necessary to make such adjustments to secure a well balanced heading. This type of heading should be set in 10, 12, or 14 point type, depending on the effect desired. In most cases it makes a pleasing effect to set the name in the next larger size of type than is used for the street and city. It is usually good style to place four points between the name and street lines, and only two points between the street and city. This produces a natural grouping.

Make out a project sheet and follow the same procedure as has been followed in previous projects.

Printing Personal Envelopes

The printing on the envelopes for personal stationery should be on the back flap. Monograms are rarely used on
the envelope. Although it is proper to print the name and address on the envelope, some people prefer to use just the address. Very rarely is the address printed on the front of the envelope. This is called a corner card and is largely used by business firms.

The envelopes should be fed into the press open so as to avoid having to make-ready on the press to compensate for the various thicknesses of the envelope. Feed the envelopes in with the flap up. In placing the location of the printing area on the flap, try to avoid having the type print over the gummed area as the hard glue damages the type face. Where the flap is deep enough cut to allow, give 2½ to 3 picas margin at the top of the envelope so it will not look as if the type is shoved up against the top edge of the envelope.

If you are printing both writing paper and envelopes add the layout for the envelope on the project sheet and secure the instructor's ok, then proceed as in previous projects.

Making a Note-book Cover

On a project sheet layout a working diagram for a pair of note-book covers with the following measurements. The cover to be 5½" x 9" with a hinge 3/4" x 9". Two holes to be punched in the hings 5½" center to center. The end sheets should be 5½" x 8 3/4". Show the working diagram to the instructor for his ok. Then using the rules already learned in lesson, Bindery Processes, complete the above projects.
When it is complete allow the instructor to check the work for a grade and then place your lecture notes, proof and project sheets in the note-book cover.

Making a Snapshot Album

Snapshot albums are made in various sizes so that a given number of pictures taken by a certain camera will fit neatly on the page.

Decide on the size of the snapshot album which you would like to make. Layout a project sheet for the album and secure the instructor's ok; then proceed to complete the project and secure a grade.

Printing a Party Invitation

Refer to the American Type Founders catalog and examine the wording and styles for setting various invitations and announcements. Then layout a project sheet for an invitation to a party. Show the line arrangement, type face and sizes, and show it to the instructor for his ok.

Proceed to set up the type, make-ready and print the project. Turn in a finished invitation with the project sheet for a grade.
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