PREPARING TECHNICAL MATERIAL FOR PUBLICATION
A Manual for Authors of College and
Station Publications

UNIVERSITY OF ILLINOIS BULLETIN
PREPARING TECHNICAL MATERIAL FOR PUBLICATION
A Manual for Authors of College and Station Publications

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This manual is a revision and enlargement of Preparation of Manuscript, published fifteen years ago by the Engineering Experiment Station. Though changes in both Station and College of Engineering policy and procedure as well as in printing practice have called for rewriting most of the previous manual, the authors of this one are glad to acknowledge the aid that they have gained from a study of Preparation of Manuscript.
I. INTRODUCTION

This style-book explains the nature of publications issued by the University of Illinois Engineering Experiment Station, by the College of Engineering, and by each of these organizations in collaboration with other divisions of the University. It offers recommendations for the preparation of manuscript and illustrations and also for proof-reading. Its own format follows pretty closely that of the usual Station publication, except that tables and figures are omitted.

1. Publications Issued by the Station

The Station issues two main kinds of publications: bulletins and circulars. A bulletin is fundamentally a record of an original investigation conducted—usually in the laboratories of the University of Illinois—under the auspices of the Engineering Experiment Station. A publication of this kind is intended for a technical reader-group. A circular may be less technical. It is a compilation of important data, some or even most of which may already be available but which has not been presented in a form readily accessible to the Station's clientele. Most circulars are based in part on investigations conducted in the University laboratories.

Whether a manuscript shall be issued as a bulletin or a circular is decided by the executive staff of the Station. Their decision is guided but not governed by the recommendations of the committees assigned by the director of the Station to review manuscripts submitted for Station publication. A reviewing committee usually consists of three or four men, selected from a somewhat larger list submitted by the author or his department head. If possible, at least one is chosen from outside the University of Illinois staff. In addition, the director of engineering information and publications is a member ex officio of each reviewing committee. He usually asks the Station and College draftsman to serve with him.

In submitting a manuscript, an author and his department head ordinarily indicate whether they consider it a prospective bulletin or a prospective circular. Committees that represent cooperating groups may be asked their views on the same question.
The Station also issues a few reprints of articles appearing in the technical press which were written by members of the College or Station staff.

2. Publications Issued by the College

College publications are more varied in content than Station publications. They include "Careers in Engineering," progress reports, accounts of certain conferences and short courses, and monographs on educational procedures or problems. Decisions on issuing these are sometimes made by the dean and at other times by the executive committee of the College. The format as well as the style may vary from publication to publication, though an attempt is made to keep the same overall size (6 by 9 inches) used by the Station.

3. Joint Publications

The College and the Station issue some bulletins and monographs jointly with other divisions of the University. The format is sometimes one that is regularly used by the Station or the College; at other times it is a format used by the collaborating agency or is adapted from that format.

II. GENERAL FORM OF STATION PUBLICATIONS

4. Cover

Bulletins are bound in a flecked gray cover paper. The front cover page carries the title of the bulletin, the number it bears in the Engineering Experiment Station Bulletin Series, the name or names of the author or authors, the words "University of Illinois Bulletin," the University volume and issue number, and the date. Bulletins reporting investigations conducted by the Station in cooperation with other research or industrial organizations state that fact on the inner front cover page. This page also carries information required by the postal laws and regulations, and the price of the publication.

The inner back cover page usually carries a brief statement concerning the purpose, organization, and administration of the Station and the means by which its publications can be obtained.

The outer back cover page is blank.

The cover of a circular is similar to that of a bulletin, but the color is light blue instead of gray.

The cover of a reprint is similar to that of a bulletin or circular, but the color is buff and printing appears only on the front cover page.

5. Title Page

The title page repeats the following information from the front cover: the series number, the title, and the name or names of the author or authors. In addition it says "Published by the University of Illinois" and, below the name of each author, gives his academic rank or his affiliation.

6. Other Preliminaries

Most Station bulletins and circulars, and some College publications, include an abstract. This normally occupies page 3 or pages 3 and 4—preferably page 3 only. It should never include footnotes; it should include tables only when their use is unavoidable. The abstract may be a digest of all chapters of the publication; or it may be a digest of the conclusions (which on occasion include recommendations); or it
may have to be limited to a brief statement of the purpose and scope of the publication. Whenever authors doubt which sort of abstract seems best they may wish to consult the editor before preparing this part of the manuscript.

From 100 to 1000 copies of an abstract are sometimes printed separately for distribution to persons who do not wish or need to study the complete publication. In this way the number of copies of the publication requisitioned, and hence the printing cost, may be reduced.

All Station bulletins and circulars carry a table of contents, a list of figures, and a list of tables. The list of figures commonly precedes that of tables, but may follow if the tables are primary and all the figures are derived from them.

7. Text

The main body of the text matter is divided into chapters, sections, and (if necessary) subsections. The form used is that employed in this style-book. Obviously, if a chapter is divided at all, it must contain at least two sections. But the first of these need not come at the very beginning of the chapter—see page 5 of this style-book.

The body of the text is printed in 10-point type set on 12-point spacing ("10 on 12"), as in this style-book. The regular size of the type page is 27 pica wide by 44 pica long. (A pica is one-sixth of an inch.) The length includes the running heads at the top of each page but not a page number at the bottom of the page, known as a drop-folio.

Quotations of some length from other publications are printed in smaller type, are paragraphed according to a different plan from that followed in the rest of the text, and are not enclosed in quotation marks. Shorter quotations are run in with the regular text matter in 10-point type; they do go within quotation marks. A comma or a period used in conjunction with quotation marks goes inside them at all times. Semicolons, colons, and question marks are placed inside the quotation marks when they are a part of the quoted matter; otherwise they are placed outside. An error within the quoted matter should not be silently corrected; attention may be called to it by putting after it the italicized word sic within brackets, supplemented if necessary by a footnote.

Footnotes to the text matter are printed in 6-point type. Reference marks to the footnotes ordinarily consist of small arabic numerals set above the line of type. However, if superscripts of this kind might be taken for exponents, the reference system should be that recommended below for tabular matter. With either system, the sequence is repeated on each page.

Whenever the reader is referred, not to footnotes at the bottom of a page but to numbered entries in the Bibliography, reference to such entries is made by parenthesized arabic-numeral superscripts. The first such superscript is followed by a superscript asterisk, and the asterisked footnote at the bottom of the page says, "Parenthesized superscripts refer to correspondingly numbered entries in the Bibliography" or "References." Use of this system means that the reference marks for such footnotes as are employed should be the marks given below for tabular matter.

8. Tables

Tabular matter that can be arranged in two or three columns, that does not require the use of ruled heading and column divisions, and that need not be shown in the list of tables is printed in 8-point type on 9-point spacing.

Other tabular matter is printed in 6-point type. Such tables are numbered with arabic numerals, and the titles are printed in 8-point type. The font used for subtitles and column headings is 6-point. Footnotes for a table— which are to be avoided wherever possible—are 6-point type and are placed immediately below the table. They are referred to by the following symbols, used in the order given below:

1. * (asterisk or star) 5. § (section mark)
2. † (dagger) 6. ** (double star)
3. ‡ (double dagger) 7. †† (two daggers)
4. ¶ ("para") 8. ‡‡ (two double daggers)

Whenever possible, tables are arranged vertically on the page. When the number of columns is so great that the table cannot be fitted into one-page width, it may be placed "broadside" on the page, with the title at the left-hand side of the page. An alternative method is to have the table occupy two facing pages, reading continuously across them. Such an arrangement, however, throws a great burden on the reader and is usually inadvisable.

An extremely complex table may have to be printed on a separate sheet. This is afterward tipped in at the desired place in the text, and folded; or it is folded and then put into a manila pocket attached to the rear cover. Every effort should be made to avoid the use of these folded inserts or of pocketed matter; they greatly increase the cost of production and may become torn or detached in handling.
9. Figures

Material used to illustrate Station bulletins and circulars consists of engineering drawings and photographs. The drawings are usually of test equipment and samples, apparatus setups, block diagrams, flow-sheets, charts, graphs and curves. The photographs are of equipment or portions of equipment, test samples, and certain types of experimental results such as photomicrographs or oscillograms.

These illustrations are generally classified either as line etchings or as halftones, depending upon the method of engraving required. All drawings are made into zinc line etchings; photographs into copper halftones. The basic difference between the line etching and the halftone is introduced in the engraving process when the illustration is photographed prior to the actual making of the “cut” or “plate.” For line etchings the camera is used with a plain lens that exactly reproduces the original drawing. To make a halftone cut, the camera is used with a special lens which incorporates a rectangular grid of hairlines (screen) and which therefore produces a negative consisting of a series of minute squares or dots. The amount of screening is indicated by the number of lines per inch and can be varied to allow for the quality of the paper used in printing and the amount of detail required in the finished cut. Halftones for Station publications are made with a 120-line screen.

As far as possible the cuts are made to full-page width — 27 picas — and are arranged to read vertically on the page. Often, however, the proportions of the illustrations are such that this arrangement is not possible or desirable. The cut can then be made either less than a full page width — but never less than 18 picas — or be placed “broadside” on the page so that the bottom of the figure is at the right-hand side of the page.

Occasionally the graphical presentation of experimental results will necessitate the use of certain curves, charts, or flow diagrams which, if they are to be useful, cannot be reduced to the regular page size. Every means for avoiding these offsize illustrations should be thoroughly exhausted before the decision is reached to use them. Whenever they have to be employed they are handled in the same manner as oversize tables — that is, they are tipped in or else are pocketed.

Captions for the figures are printed in capital and small letters in 8-point type and are placed below the figures. Therefore the caption for a broadside cut is read from the right-hand side of the page. Any necessary notes are printed in 6-point type below the caption.

10. Appendix Material

A good rule governing the inclusion of appendixes other than a bibliography is Don't. They may, however, be desirable when you have to aim both at readers who will be satisfied with a brief treatment of your subject and at specialized readers who desire supplementary material. Such material may be of several kinds — a historical sketch of the subject; mathematical treatment that is too long or too involved to go into the body of the text; on occasion a glossary; sometimes, details of controversies; rarely, tables or illustrations that carry conviction to the highly technical man but that would prove needless or even confusing to the less specialized reader.

If more than one appendix is used, each is identified with a roman capital letter, as “Appendix A,” “Appendix B,” etc. An appendix of some length may be divided into numbered sections, using arabic numerals in the numbering, just as in the text. The numbering continues that used for sections in the body. Appendixes other than bibliographical are generally printed in 10-point type; but for any that consist entirely of computations, smaller type is ordinarily used.

A bibliography, when furnished, is inserted as an appendix. It may be called by any one of three names — Bibliography, Selective Bibliography, References. It is generally printed in somewhat smaller type than the body; 8 on 9 is common.

Station bulletins and circulars have thus far not contained indexes. If one seems essential, it is labeled “INDEX,” forms the last part of the publication, and is set in small type.

11. List of Publications

Some bulletins end with a list of relevant Station publications. Certain others end with a list of the most recent Station publications regardless of their subject. The editorial staff draws up such a list after consulting with the author and the director of the Station.

12. Form of Reprints

Because reprints are usually not set in type by the Station printer but are purchased direct from the journal in which the reprinted article originally appeared, there is no standard form other than that the page size is usually 6 by 9, as for bulletins and circulars. The editor may ask the author's aid in preparing the title page, which generally is set in type by the Station printer but which may be specially ordered from the original publisher.
III. GENERAL FORM OF COLLEGE PUBLICATIONS AND JOINT PUBLICATIONS

Publications that are issued by the College rather than by the Station or that are issued jointly with other divisions of the University will generally have the same overall page size as Station publications. Occasions arise, however, when a different size is desirable. Moreover, even the 6-by-9 publications may differ from Station bulletins and circulars in the amount of printed matter per page, in its placing, and in the number and placing of figures and tables. Therefore no rigid description or set of specifications can be given. Instead, prospective authors should get in touch with the Station and College editorial staff before preparing the manuscript. They should also expect to confer frequently with fellow authors or editors from other divisions of the University.

IV. CONTENTS OF STATION PUBLICATIONS

13. Essential Properties of Bulletins and Circulars

Every account of an investigation should give the intended reader a comprehensive view of the subject dealt with, a clear description of methods used in carrying on investigations and arriving at conclusions, and the means of applying to practical problems the conclusions reached. At the same time, conciseness is vital both to busy readers and to those charged with keeping publication costs just as low as is practicable. Hence each Station bulletin and circular should be a digest of a full report. It should retain only those details needed by its readers. One way to keep out a mass of data is to say that such data are on file and may be examined, under conditions specified by the department, in the original form or in photostatic copy.

To attain conciseness, the collaboration of cooperating groups and reviewers as well as of authors and the editorial staff is essential. Cooperating agencies and reviewers should also heed Station and College policy. For example, Station publications avoid the use of trade names. Only such of those names as are universally employed should be used in manuscripts.

The goals of usefulness, conciseness, and economy imply that all authors should strive for directness and simplicity at all times.

14. Adjusting to Readers

Just how to attain these virtues depends partly on the nature of the subject matter. It depends still more on the reader-group aimed at. Even before beginning to write, therefore, every author should decide what that group is, what knowledge it already possesses of his subject, and what additional knowledge it presumably wants. The author should then determine what forms of presentation—words, tables, charts, photographs, sketches, curves, equations—will most clearly, quickly, and economically convey the essential information. He should so plan his manuscript that all references to his key state-

1 For material in this Section and in some later Sections, the Station is indebted to Harper & Brothers, holders of the copyright of Engineering Reports (by L. A. Rose, B. H. Bennett, and E. F. Reuter). Direct quotations from this book are set within quotation marks.
ments, tables, and illustrations are perfectly clear not only on consecutive reading but also for spot-checking.

When he has to aim simultaneously at different reader-groups he should do at least two things: (1) he should make the abstract of his document clear to every reader-group by giving it a view of the major problems he deals with, the gist of his investigative methods, and his main findings and conclusions; and (2) when writing the body of the bulletin or circular he should try to answer the basic questions likely to be raised by all the reader-groups. As has already been said (page 11), he may then have to put into appendixes certain data that his more specialized readers expect but that other readers would find puzzling or meaningless.

Many publications for a homogeneous group of specialists may omit the abstract and start with the conclusions—only when the conclusions will be clear (though they may not yet be convincing) without a study of the details on which they are based.

It has been customary in Station publications to label the first chapter of the body "Introduction." You need not follow the custom if some other method of beginning the bulletin or circular will save your reader either time or effort.

It has also been customary to include in the first chapter a numbered section of "Acknowledgments." You can often dispense with this: no thanks need be given to the director of the Station, to department heads, or to other superiors whose assistance has formed part of their regular duties. Whenever such acknowledgments as still ought to be made are few, you can include them in a section explaining the scope of the publication.

The statement of scope may be preceded by a statement of purpose or may incorporate the statement of purpose. The choice depends on which arrangement will best help your readers understand what goal the publication aims at and what ground it must cover in reaching that goal. "The statement of scope can often be brief, expanding slightly upon the title of the publication. Or it may be fairly full, enlarging not only upon the title but upon the table of contents. It may go beyond the latter by telling why you have covered all the topics you do and why you have omitted certain material that your reader-group might expect to find." This part of the manuscript may also tell the place of the present publication in a series. Whatever its contents, the statement of scope should occupy not more than 5 percent of the space allotted to the text of the bulletin or circular.

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1 Roe, Bennett, Heater, Engineering Reports, p. 190, with slight change in phrase.
had better be divided into two or even three chapters. Chapters should
vary somewhat in length throughout a publication.

All of these recommendations imply that, before you start to write,
you should clearly determine the point of view of your bulletin or
circular, and should keep it throughout.
The viewpoint should be primarily that of your intended reader.
And his viewpoint almost always is practical. He is generally interested
in findings and applications rather than—or at any rate more than—
in methodological problems. Remember that many scientists and engi-
neers go into too much detail regarding their investigative techniques.
The readers of most publications issued by the College and the Station
are interested rather in practical applications, trust the staff of the
College and the Station to do honest research, and usually desire
definite conclusions or—where these are not justified—the inves-
tigator's best judgment.

16. Using Tables, Illustrations, and Equations

Most readers of Station and College publications prefer concrete
presentation to abstract. This in turn means that they would like a
fairly extensive use of tables and graphs. Unfortunately, printing costs
have risen so greatly in the past few years that presentation of data
by these means is very expensive. The use of equations is more ex-
pensive still. Consequently, though Station and College publications
will always contain much tabular and graphical material, and a num-
ber of equations, you are urged to restrict your use of these so far as is
possible. In particular, please note that it is seldom wise to duplicate
completely the presentation of results. When you give a very complete
set of tables, one or two representative graphs may suffice; conversely,
when you give a comprehensive set of graphs, tables may be omitted
or at least greatly reduced in size and number. Experience indicates
that for the average reader of engineering material, curve diagrams
or graphs are more useful than tables.

In any event, plan your presentation as a unit. Before setting pen
to paper, have a distinct idea of the number and kinds of tables and
of illustrations you plan to use. Make or get a fairly accurate estimate
of what they will cost. Unless you have had much experience in pre-
paring manuscripts and computing printers' and engravers' charges,
consult with the Station and College draftsman and editorial staff.
Always do this if you intend to use any tables, charts, or equations
whose physical size is unusual or which contain symbols that the
printer may not have in his fonts.

17. Vocabulary and Phrasing

At some stage before submitting the manuscript to reviewers, make
sure that you have used the level of phrasing and vocabulary which
your subject matter and the nature of your readers call for. Many
scientific and engineering writings contain inflated diction. They would
gain by the use of simpler words for simple facts and ideas. Even a
rather complex topic can usually be treated in plainer language and
by means of shorter words than the average writer at first thinks is
possible. Reviewers share with the author the responsibility for keeping
the diction easy to understand.
V. PREPARATION OF COPY

A regulation of the Engineering Experiment Station states that after a bulletin or circular has been approved by the executive staff, alterations in the manuscript or illustrations, except those recommended by the reviewers, may be made only with the formal permission of the director. This means, of course, that all copy—both manuscript and illustrations—must be as close to its final form as possible when it is submitted to the director.

It is the duty of the Station editor and draftsman not only to be available to authors during the stages of preparation discussed in this chapter but also to review and edit the completed manuscript before it is submitted to the director for assignment to reviewers. The procedure, therefore, is for authors to consult with the editorial office as often as need be during the actual preparation of the manuscript; submit the manuscript to the editor for preliminary review and editing; incorporate changes deemed necessary by the editor; submit to the director the number of copies required, and names of proposed reviewers; if the copy is approved by the executive staff, make the changes requested by the reviewers; and submit the copy to the editor for his final work on it and for his transmittal of it to the printer.

18. Instructions for Preparing the Manuscript

Number and Format of Copies Submitted. The manuscript furnished to the director of the Station for assignment to reviewers should consist of four typewritten copies—one original and three carbon copies—double spaced, on 8½-in.-by-11-in. sheets, with a liberal margin at each side and with about 1 in. of blank space at top and bottom. If reviewers urge many or major changes, part and sometimes all of the manuscript may have to be retyped before it goes—again in four copies—to the editorial office.

The copies must be typed; mimeographed copies are not acceptable.

Each of the four copies of the manuscript should contain a title page, a blank page after it, an abstract (except when the practice named on page 14 is being followed), the table of contents, lists of figures and tables, the body of the text with all necessary footnotes, and an appendix or appendices if desirable. The title page should be numbered as page 2, because the editor furnishes the printer with an instructions page which becomes page 1. All pages of the manuscript should be numbered consecutively, in the upper right-hand corner.

Editing will be expedited if each full line occupies approximately 72 typewritten spaces, paragraphs are indented 5 spaces, and each page except the last one of a chapter consists of 26–28 lines.

Adding and Deleting Material. When it becomes necessary to add or delete, the procedure is as follows. (1) If one line or less is to be added, the addition should be written between the lines, using the caret to show the place of insertion. (2) If a paragraph or more is to be added, the place for insertion should be clearly marked with “Insert p. 14A,” “Insert p. 71B,” etc., and the insert typed on a separate 8½-in.-by-11-in. page. This new page should be marked “Insert p. 14A,” “Insert p. 71B,” etc. (3) At the bottom of any page preceding one or more full-page inserts should appear “(P. 22A follows).” The next page, the first of (say) a two-page insert, should be numbered “22A”; at the bottom of it should appear “(P. 22B follows).” Inserted material should never be typed or written on the back of the sheet nor on a loose paste-in. (4) If a line or less is to be deleted, a horizontal line should be drawn through the part to be omitted. (5) If a paragraph is to be deleted, a diagonal line drawn across it will suffice. (6) If a page or more is to be omitted, it is discarded, and the number or numbers of the page or pages omitted are indicated after the number of the page that precedes the part omitted. Suppose that it is decided to omit pages 24 and 25 of a manuscript. Then the number at the top of page 23 should appear as “23–25.” It would therefore not be necessary to renumber the pages of the entire copy subsequent to page 23; but if the omitted pages contained numbered sections, the table of contents and the numbering of sections subsequent to page 23 should be changed accordingly.

Preparing the Preliminaries. The table of contents should be headed simply CONTENTS. The table should contain the exact titles for the chapters and sections into which the text is divided, but usually omits subsection headings. The articles “a” and “the” should be omitted whenever possible. The chapters should be numbered consecutively as they are intended to appear in the publication, using roman numerals. The sections should be numbered with arabic numerals. Page numbers should be omitted. Modern practice uses no leaders (., .).
The list of figures should be headed simply FIGURES. The list should contain the exact captions of the figures used to illustrate the text. The figures should be numbered consecutively as they will appear in the publication, using Arabic numerals. Charts and flowsheets are usually considered as figures, and are so named and numbered. Leaders and page numbers should be omitted.

The list of tables should be headed simply TABLES. It should contain the exact titles of the tables occurring in the text. The tables should be numbered consecutively as they will appear in the publication, using Arabic numerals. Leaders and page numbers should be omitted.

The lists referred to above should be double spaced except that below the words CONTENTS, FIGURES, and TABLES six spaces should be left. In any title — whether of a chapter, a section, an illustration, or a table — that runs to more than one line, the second and the following lines should be indented four spaces from the beginning of the first word of the first line.

Preparing the Text Proper. The manuscript for the text matter should be prepared with great care. The standard form of headings for chapters, sections, and subsections as exemplified in this style-book should be closely followed. In typing the manuscript do not crowd anything to save paper; it is impossible to make the copy too plain, and reasonable room should be left both for editorial corrections and for full instructions to the printer.

When the manuscript is to contain clippings from some other work do not copy them if they are of any length. Using rubber cement, paste such clippings on the page of the manuscript in the proper place. Do not pin or staple them, nor attach them with Scotch tape.

On the copy that the editor sends to the printer, cross-references should be as follows: Fig. 17 (page o) or Section 12 (pages o--o). But on at least one copy you should name the manuscript pages to which you refer.

When you must correct a numerical quantity expressed in figures do not write one figure over another so as to cover it; this always confuses the typesetter.

In using the lower case letter "l" by itself, particularly in connection with or near numerical values expressed in figures, do not type but write it in longhand. As typewritten the letter l and the numeral 1 look alike to the typesetter.

1 A capital letter begins the first word of each chapter heading, section heading, subsection heading, title of a table, and figure caption; every important word within any of these elements; and every preposition in them containing five letters or more (Above,. After, Before, Through).

Unless a special typewriter is used it will be necessary to write in all Greek characters, all accents, and umlauts. Greek characters must be written so plainly that the typesetter cannot help recognizing them.

In the text proper, write numbers of four digits without internal spacing or a comma. Numbers of five digits or more take one or more commas, but not internal spacing. All decimal numbers having no units should have a zero placed before the decimal point.

Numbers expressing a range (such as 175–200 F) should be hyphenated rather than separated by the word "to" or by a dash.

It is permissible to abbreviate any words or terms commonly abbreviated in good literary practice; but in general, abbreviations should be restricted to terms commonly abbreviated in the best engineering writing, and ordinarily used only after numerals. The Station employs the abbreviations recommended by the ASA — rpm, emf, ft, in., p.s.i., Btu, and so on. Most College — as distinguished from Station — publications use few abbreviations.

In referring to the illustrations the term "figure" should be used; in referring to a particular illustration this should be written "Fig." (in the plural, "Figs.") followed by the number of the figure, except that when it is the first word in a sentence it should be spelled out.

Numerical values, including percentages, may be expressed in figures, except those at the start of a sentence.

In the body of the text the symbol % should not be used; the word "percent" is written out in full. It is, however, permissible to use the symbol in the column headings of tables in order to save space.

All temperatures should be expressed in figures, followed by the capital letter indicating the scale used. However, when one scale is used throughout, conciseness will be served by a footnote — cited after the first temperature value given — reading about as follows: "Hereafter, all temperatures are given in degrees Fahrenheit except as otherwise specified."

Numerical adjectives used in connection with the dimensions of parts should be expressed in figures, for example, "a 5-in. pipe," "a 4-ft radius." Observe the placing of the hyphen in such expressions as "6-, 7-, and 8-story buildings." The number may be written out in such expressions as "one-piece."

A series of similar major statements (as in a summary of findings, conclusions, or recommendations) within a numbered section should ordinarily be numbered each with an Arabic number in parentheses, each statement being a separate paragraph.

1 Please note that (1) no plural sign is added to the abbreviation and (2) no period is used except to avoid confusion with a full word.
Setting Up Equations. Unless a special typewriter is used it seldom is possible to typewrite equations, except very simple ones. Lack of care in writing equations is one of the most frequent causes of excessive composition and alteration costs. It is impossible to make copy for equations too plain, and unless you write unusually legibly it is better to handprint such copy, using a style of lettering similar to Reinhardt script. You should take particular care to indicate superscript and subscript letters and figures clearly, and also Greek letters both capital and small.

All symbols that are to be italicized in print should be underlined. The underlining should not extend beneath superscripts indicating exponents, nor should it be used with Greek characters or with symbols indicating arithmetical operations.

Since the editor must mark up equations for the printer, extra space should be left above all lines separating numerators from denominators and to the right and left of superscripts and subscripts.

There should be no space between letters forming products.

Leave four spaces above and below each equation. Do not break over an equation from one page to another.

Number all fundamental equations with an arabic numeral in parentheses placed at the right-hand side of the type page. When an equation occupies two lines or more, divide it at some logically major point, and align the parenthesized number with the last line.

Footnotes. In a manuscript, footnotes should be placed at the bottom of a page, double spaced, and indented as is material in the body proper. Footnotes should be separated from text material by two vertical spaces and a line about 1 in. long that begins flush with the left-hand margin of the typescript.

The indexing of footnotes begins afresh on each page of the manuscript, regardless of whether the footnote reference symbols are arabic numerals or any of the marks listed on page 9.

In writing footnotes, you may ordinarily use standard abbreviations for the names of engineering and scientific societies and publications. But be governed by the reader’s convenience: use no abbreviations that will puzzle him or drive him to reference works. Your own familiarity with an abbreviation gives no assurance that he will interpret it quickly and correctly.

Tables. Manuscript copy for tables should be on separate pages that are numbered to follow the last page of the running copy of a manuscript. Only one table should be put on a sheet. There should be at least 3/8-in. margins at both left and right. Text matter should not appear on the sheets which contain copy for tables. However, sheets with tables that bear no table numbers and titles should carry a penciled notation showing clearly with what part of the text each such table belongs.

Printers will not accept blueprinted tables.

“When your typescript contains tables that were originally copy for lantern slides accompanying a talk, be sure that you number and title these tables and that your manuscript refers to all of them.”

The title of a table should be short and specific. It should be placed four spaces above the table, and the table number in turn should be on a separate line centered two spaces above the title. In typescript the title will therefore look like this:

Table 2

Calculation of Derived Stiffness Factors

Between the title and the table itself may come descriptive matter.

Tables should be open at both left and right. Completely enclosed tables are seldom either necessary or effective.

The Station and the College have no single style for the use of "rules" (lines used to mark the beginning and end of a table and to separate columns and rows within it). In general an attempt is made to avoid horizontal rules (cross-rules) and to use few vertical rules (down-rules). Since practice is not standardized, you should consult with the editorial staff before ruling any tables.

Column headings within tables should be accurate but brief. Where necessary to save space, symbols rather than abbreviations may be used for degrees and even for feet and inches. Column headings for similar tables should be as far as possible be consistent in phrasing and form. Consistency should also be observed between the column headings of tables and coordinate titles of curves plotted from the same data.

"Within columns of tables, align on decimals. In a long column of decimal fractions that are all less than unity, you may put zero only before the first number and the last. You can do the same with arithmetical, monetary, and degree signs.

"Indent averages, totals, and means in the first column of the table." (The abbreviation for "average" is "av" without a period.)

Space numbers of four digits or more by threes from the right:

4 006 or 16 372 or 3 000 000.

To indicate lack of certain data, use ellipsis dots (....) rather than blank spaces, hyphens, dashes, or asterisks. Insert as many dots as there are spaces in the longest entry within the column.

1 Rose, Bennett, Hostet, Engineering Reports, p. 114, slightly rephrased.

2 Ibid.
**Capitalization and Spelling.** Station style for capitalization is about midway between literary style and newspaper practice. Specifically, titles after a name are not capitalized, nor are names of departments. Technical words that were once proper nouns but that are now common nouns or adjectives derived from these are set in small letters; an example is “diesel.”

Such prefixes as *inter*, *non*, *pre*, *semi*, and *un* are usually run in with the rest of the word. Among words that are also “run solid” rather than hyphenated are *midheight*, *midlength*, *midspan*, *overtun*, *underestimate*, *overstate*, *knockout*, *carryover*, *pickup*, *puffback*, *waterway*, *checklist*, *flowsheet*, *bypass*, and *byproduct*. The trend in engineering publications is to use as few hyphens as possible and therefore to “close up” many expressions that formerly were separate words or took hyphens. This practice also helps to avoid the undesirable occurrence of successive end-of-line hyphens and of a hyphen at the end of the top or bottom line of a page.

**Bibliographies.** The Station used to insist upon a rigid form for bibliographies and for lists of references. Present practice allows much leeway. However, you should generally number each bibliographical entry, should start each entry with the name of the author or authors of the work cited, should see that the following items are in the same order in each of the entries, and should make sure that consistency is observed throughout the bibliography. Works issued by organizations may list the organization as the author if no individual author is named; when an individual author's name is given, the organization should be listed as the publisher.

Titles of magazine articles, and of parts or divisions of books and Transactions or Proceedings, are set within quotation marks.

The Station and the College have no one style for listing titles of books and names of magazines. The guide is the reader's convenience. When quotation marks within a bibliography or list of references are few, then titles of books and names of magazines may be set in roman type. But when quotation marks are numerous, it is better to italicize (underline) titles and magazine names.

You may abbreviate names of magazines and organizations whenever users of the bibliography will find the abbreviations familiar. The standard reference to a Station publication is “Univ. of Ill. Eng. Exp. Sta. Bul. 387.” Other permissible abbreviations are “vol.,” “no.,” “p.,” and “pp.” But the simplest way to indicate both volume and pages is thus — 12:202-11. The year of issue of any publication cited should be given. If the month (abbreviated) is also given, no comma intervenes between the name of the month and the year.

Triple-check the spelling of all proper names and all foreign words before the manuscript is submitted.

The typed bibliography should be double spaced throughout, and the first line of each entry should be indented as for regular paragraphs.

**19. Instructions for Preparing Illustrations.**

The need for giving careful thought to the planning of illustrative material along with the written matter cannot be overemphasized. If, as frequently happens, the material you are planning to submit as a bulletin or circular has previously been presented in a different form, such advance planning is even more essential. It consists primarily of answering two questions — How many and what kind of illustrations should I use, and How should they be prepared?

When your material is reproduced by mimeograph and blueprints, the answers to these questions can be quite arbitrary. Generally you can plan on as many figures of any type as you desire, and can make them in any suitably consistent manner. However, when you get ready to rearrange this material or when you are preparing it originally for a bulletin or circular, you should not only carefully review your manuscript but at the same time examine each illustration with a very critical eye.

To determine the kind of illustrations to use, you can classify them into two general groups — those which serve as the principal means for conveying a particular item of information, and those that are either complementary to or strictly supplementary to the other media (written text or tables). For example, many experimental results are presented solely in a graph, whereas a test specimen may be described both in the written text and by a drawing.

Having classified all your illustrations on this basis, you can generally include most of the first group in your manuscript and feel fairly certain that they are necessary. As to the second group, however, you will need to be much more discriminating. Each of these figures should be carefully compared with corresponding written material. As many of them as possible should be discarded and the text matter rewritten as necessary. You will undoubtedly find that most of the illustrations of this group can be so eliminated. To a lesser extent the same procedure can be used on the illustrations of the first group, but in this case your decision ought to be based on whether or not the particular information you want to convey can be satisfactorily presented by written text alone.

By following either this or a similar procedure in your planning, you will automatically arrive at the number of illustrations. No attempt
is made here to ask you to observe a certain proportion between the amount of text and the number of figures; each publication presents its own problems in this respect. Occasionally, however, it may be necessary to ask you to restrict the total to a particular number.

General Considerations. To insure uniform appearance, the illustrations for all Station publications are prepared in their final form by the Station draftsman. The original drawings are prepared either by the author or by persons under his immediate supervision. In the latter case both the author and whoever does the actual drafting should keep the following instructions well in mind. Drawings that cannot be made according to these specifications or that present special problems of layout should be discussed with the Station draftsman sometime during the planning stages. The reason that underlies all of the following instructions is to reduce the cost and time of preparation.

Since the final drafting is done by the Station draftsman, the original drawings need not be elaborate. But they should be complete and correct. Carefully prepared pencil drawings are acceptable. In general, line drawings of equipment, block diagrams, circuit diagrams, flowsheets, etc., should be laid out and prepared carefully enough so that the final drawings can be traced directly from them. Those of curves and graphs should be so prepared that the plotted data points are unquestionably clear. As a matter of fact, the curves themselves can be sketched in freehand so long as the data points stand out. You can make the data points prominent by plotting them as single pencil points and then enclosing in one of the following symbols each point associated with a particular curve:

```
  o  △  ○  ▽  and, if needed,  ◐  ◐  ◐  ◐  ◐
```

On the final drawing or tracing these will appear as:

```
  o  △  ○  ▽  and  ◐  ◐  ◐  ◐  ◐
```

You should then sketch in the curve so that it does not cross any of these data point symbols. If additional symbols are needed, variations of these can be used provided that they do not cover the data point itself.

Any type of drawing ought to be so planned that a minimum number of notes is required. Whatever notes are necessary should be unmistakably clear both in their phrasing and in their location on the drawing. Since, in the final publication, the figure number and the title of the drawing are set in type, these should not appear on the body of the drawing. For identifying the original illustration they can be placed in one of the margins.

Regarding Notes on Drawings Submitted as Final Copy

(To be added after the last paragraph of p. 26, Circular 62)

This problem is complicated by the fact that many of the drawings which authors think of using in Station Bulletins or Circulat,rs have been made for preliminary or cooperative reports. Such drawings usually contain far more notes and information than are necessary for use as copy for Bulletin or Circular drawings.

Much of this material will be discarded. That which remains necessary falls into two categories:

(a) Statements regarding general test conditions, assumptions, etc. should usually be covered in the text, and any special application should be brought out in the text discussion accompanying the figure.

(b) Statements regarding specific things shown on the drawing are usually presented to better advantage as notes on the drawing. These should be held to the lowest practicable minimum and should not be repeated in the text.

Request to Readers: On page 31, in line 1, change the fourth word ("the") to "your."
the title (caption) itself should be as brief as possible. Many authors include too much information in it and thereby lengthen it unnecessarily. It needs only to convey a general idea of the subject; it does not need to contain a detailed description of what is in the drawing or curve. Essential details may be included as notes, or, in the case of curves, they can frequently be incorporated into the titles for the coordinate axes. The caption for a photograph, on the other hand, can be somewhat more detailed because it is the only element of the illustration that can be used for verbal description. Even so, photograph captions should be kept to a reasonable length, and the major discussion included in the text.

Photographic illustrations—especially those of test specimens, photomicrographs, and oscillograms—usually present few difficulties. Larger photographs of individual test equipments or of test setups should be planned with special attention to the composition of the picture. You should remove from the field of view all extraneous equipment and instruments that will clutter up the final picture and detract from the principal subject. You should also carefully plan the background to keep distracting elements to a minimum. To make good cuts, the prints themselves should not be too “strong” or “contrasty” but rather somewhat “flat” and with good detail.

Quantity and Quality. Each original line drawing should be made on a separate sheet of tracing paper or thin graph paper so that it can be used to make the reproductions for the four copies of the manuscript. Although in the past blueprint reproductions have been accepted, for greater reading ease blackline ozalid reproductions should be used for the manuscript copies. If, as frequently happens, you make the reproductions from corrected tracings of the original drawings or if you later correct the reproductions in the manuscript, the Station draftsman still needs the set of original drawings rather than any subsequently corrected tracings or reproductions. He then incorporates the corrections into the final drawings by using a corrected manuscript copy along with the original drawings. In view of this requirement you are asked to keep the original drawings on file and to make them available to the Station draftsman at his request.

A total of six glossy prints of each photographic illustration is needed. Of these six sets, four should be mounted in the manuscripts and the other two should be filed with your original drawings. The two filed sets should not be mounted, should not contain any markings on either the front or the back, and should not be clipped or fastened together in any way.
Sizes. One of the most important and also one of the most difficult specifications to follow is to make the drawings to a particular size. Ordinarily the subject matter of the drawing puts restrictions not only on its size but on its proportion. Often the restrictions go directly counter to the requirements of the method of printing. Needless to say, when such a conflict occurs, there is usually no way to circumvent the limitations of the printing method. Hence the drawing must be rearranged or reoriented.

It is not hard to determine what size your original drawings should be. There are only three items of information you need:

1. The body size of a full page, which is 4 1/4 in. by 7 in.
2. The desired size of the finished cut, which you can determine.
3. The reduction ratio used in the engraving process, which for Station publications is anything between 2:1 and 2 3/4:1.

The reduction ratio means that your original drawings should be between 2 and 2 3/4 times larger than the finished cut. These ratios best permit you to visualize with some accuracy the appearance and proportioning of the finished cut. In the case of a full-page drawing the finished cut size, after making allowance for the caption, is either 4 1/4 in. by 6 3/4 in. or 7 in. by 4 1/4 in., depending on whether the cut is vertical or “broadside.” These are the overall dimensions of the cut and should include every element — notes, coordinate titles, etc. — that appears on the drawing.

For drawings that are less than a full page long you must determine the finished size you want the cut to be. Recall that the cut size should be of full page width — 4 1/4 in. — wherever possible; or not less than 3 in. if it must be narrower. You should also recall that the length of a part-page cut should be less than two-thirds of a page — that is, 4 3/4 in. — but not more. If the material won’t fit in this length, then you should use a full page. With this amount of tolerance in both the width and the length of the cuts, you should easily be able to find a size within these limits which gives you the desired proportions. Or, working from the other direction, you will probably be able to rearrange the elements of the drawing so that its proportions fall into these limits.

To find the proper size for your original drawing, then, you need only to multiply the finished cut dimensions by any number between 2 and 2 3/4, both inclusive.

The sizes of photographs you usually have less control over, because the prints are made in standard sizes. However, the 8-in.-by-10-in. size permits trimming to get best results. The size of photomicrographs, oscillograms, and the like is determined by the instruments used to obtain them.

Special Problems. In doing almost any kind of drawing you are bound to run into a few subjects that you cannot handle according to specifications. In general these special problems should be discussed with the Station draftsman to find out whether they can possibly be solved by usual procedures or, failing that, to determine exactly how to solve them.

Misproportioned or oversize charts, curves, flowsheets, etc., should invariably be discussed with the Station draftsman; no generalized instructions about them can be given here.

Combining drawings, however, is a problem on which you can usually do much of the preliminary work. For the most part there are two types of possible combinations. One involves putting two or more line drawings or photographs on a single page with each figure reduced and with allowances for each figure caption so that the overall size of the combination is 4 1/4 in. by 7 in. These may be so arranged that the group is either vertical or broadside. This type of combination is especially useful for a series of small photographic illustrations. When it is used for curves and graphs, the coordinate scales should be made the same, if at all possible. To find the proper sizes for the original drawings, you again need to determine the cut sizes and proportions for each figure of the combination. You can probably do this most easily by sketching the combined page layout approximately to scale.

The other type of combination involves placing two or more curves on the same sheet of graph paper. When this method is employed, the same coordinate scale must, of course, be used for all curves. Generally the number of curves combined in this way should be restricted to about a half dozen, and for each curve of the group the data point symbols should be used in the order of preference shown on p. 26.

In planning your material you will find that many of the illustrations can be presented much more effectively in some form of combination than by themselves. In addition the publishing cost usually demands that combinations be made wherever they can. Therefore whatever combinations you can work out during the planning stages will save considerably more time later on, because you are familiar with the subject matter and already know what figures can be conveniently combined.

Consistency and Checking. This section of the instructions contains counsel and advice rather than hard-and-fast rules. The subject of consistency is included here because, by paying a little attention to the consistency of your drawings, you will not only improve their overall appearance but also eliminate many errors. The principal advantage of consistent practice, however, is that it keeps the reader from raising
the question: Did the author really intend these to be different or are they the same thing?

There are a number of places where you should make a special effort to be consistent; only a few of the more important spots are pointed out here. The first of these concerns combined drawings, and drawings that are not actually combined but that constitute a logical group. Identical symbols and notations should be used on these drawings wherever possible. If a particular part is referred to on more than one of the drawings, it should be called by the same name on each one. If a note is common to all the drawings, try to place the note in the same relative position on each one. If the group of drawings are curves, make every effort to use the same coordinate scale throughout for at least the horizontal axis and preferably for both axes. If each drawing of the group contains several curves each of which is associated with a different subject, then use the same data point symbols for all of the curves associated with the one particular subject.

Consistency is also especially important in the symbols and notations used for data which are presented in both tabular and graphic form. Too frequently, in plotting a curve of data presented in a table, an author uses titles for the coordinate axes which are entirely different from the corresponding column headings in the table. Or in the table he will use one symbol to represent a particular quantity and in the curve he will use a completely different symbol.

Related to this type of inconsistency is that which occurs between tables and text matter, between curves and text, or among all three. So, for that matter, are those inconsistencies which occur among any of the media of presentation. These are the most difficult to control, because they can be spotted only by careful checking of the drawings against tables and text and vice versa. To some extent they can be reduced in the preliminary planning, but careful checking is the only sure way to eliminate them entirely.

Careful preliminary planning and final checking are important when you make the drawings yourself. They are even more important when you have someone else do the actual drafting. And they are especially important when you have more than one person working on the drawings. Final checking is essential in order to prevent not only inconsistencies but also errors and downright blunders. It should be done sometime during the early stages of writing the bulletin, so that you don’t base parts of the text on incorrect drawings. Both the planning and the final checking should be done by you, the author, and not by the draftsman or someone else equally unfamiliar with the complete bulletin. It may take you a day or two to check through a group of drawings, but this time is negligible compared to that lost in processing a group of unchecked drawings. In addition, unchecked drawings are invariably full of mistakes, of which one or two frequently appear in the final publication. The effort spent on assuring consistency and accuracy is well repaid by readers’ favorable reactions to a neat, sound, economical publication.

In short, check to make sure you have observed these principles:

"Give the reader all the illustrations he must have, only the ones he must have, and in the sequence which he will find most helpful.

"Make each illustration accurate, unified, clear, simple, uncluttered, balanced.

"Tie every illustration in as closely as you can with the text." 

1 Rose, Bennett, Heater, *Engineering Reports*, p. 126.
VI. PROOFREADING

All galley and page proofs are read against copy in the editorial office of the Station and the College; the proofreading done by the author is therefore supplementary. The author should, nevertheless, read all galley proofs and page proofs carefully. He should mark each error noted, not taking for granted that it will be caught elsewhere. It is the further duty of the editor and author to answer all queries raised by the printing firm's proofreaders. All persons who read a set of proofs should initial all sheets or pages after correcting them.

At this stage of publication, no alterations are to be made except those that the editor finds essential for conformity to good bookmaking practice or for unmistakable clarity.

The Station's contracts with printing firms restrict to a very few days the time that proofs may be held by author and editor. To retain the proofs longer will entail payment of a penalty and may void a contract.

20. Galley Proofs

When a manuscript has been completely edited and all necessary corrections made, it is sent to the printer to be set up in type (composed), unless it is one of the few Station and College manuscripts that are to be published by offset printing. As composition proceeds the type is placed in a galley, or long metal tray, usually about two feet in length and varying in width. As each galley is filled, an impression, called a proof, is taken ("pulled") on a small press. This galley proof is then given to a proofreader, who corrects it from copy. He marks the necessary corrections on the proof, using certain more or less standardized marks, as shown on page 35. The corrected galley proof is then returned to the typesetter (compositor).

After the corrections called for have been made, a second proof is taken. If this "revise" is found by the proofreader to be correct or nearly so, it is sent to the editorial office of the Station and College to be read by the editorial staff and by the author of the manuscript.

In the galley proof the text matter appears continuously on a series of proof sheets, without the tables or figures. The proofs of the tables are on a separate sheet or sheets. No proofs of the figures are furnished with the galley proof.

The galley proofs are read by the editorial staff against the copy, and any further corrections are indicated. The galley proof is also read by the author, as an additional check on the correctness of the typesetting.

The galley proofs bearing the corrections and alterations made by the editorial staff and the author are then returned to the printer. If the corrections are numerous a second set of revised galley proofs is requested from the printer. These revises are read by the editorial staff of the Station and the College and by the author.

When all corrections are finally made, one of two procedures is followed. If the manuscript is being printed by the University of Illinois Print Shop, one set of corrected galley proofs is "pasted up" by the editor and returned to the Print Shop. This set of pasteups—by many people called a "dummy"—is used for two purposes: it serves as a guide in the printer's further correction of the type and it tells him how to divide the material into pages and where to place all tables and figures. Other firms prefer a different practice. They wish the editor to furnish an uncut, unpaginated set of finally corrected galley proofs, and to furnish separately a pasteup using unmarked galleys.

When the first method is followed, proofs of the illustrations are pasted at the proper positions in the pasteup, each with its caption below it. When the second method is followed, proofs of the illustrations are sent separately to the printer, each one numbered to correspond with the list of figures, and with copy for the captions if this has not already been furnished. The position of all figures is marked on the pastepup sheets. Naturally, the actual engravings are also sent to the printer.

21. Page Proofs

After making all corrections called for on the final galley proof, the printer will divide the material into pages as the editor's pasteup has indicated. In doing so, the printer will of course insert all figures and their captions at the places indicated.

After the type has thus been made up into pages a set of page proofs is taken. It is forwarded to the editorial office of the Station and the College along with the marked final galley proofs. These page proofs are then read against the corrected galley proofs by the editorial staff and the author. At least four readings are desirable.
In reading the page proofs take care to see (1) that all corrections indicated on the galley proofs have been properly made, (2) that there are no other errors in the corrected lines, (3) that the appropriate running heads and page numbers are in position, (4) that page numbers check with those indicated in the table of contents, the list of figures, and the list of tables, (5) that all cross-references are accurate, (6) that all footnotes are in place on the appropriate pages, (7) that no lines have been transposed or omitted, especially at the top or at the bottom of pages, and (8) that letters or punctuation marks have not been dropped from the ends of lines.

If no revised page proofs are desired or necessary, this is the last seen of the work before it is printed. The page proofs are marked "OK," "OK with alterations noted," or "OK with corrections noted," and returned to the printer, along with the corrected galley proofs. The printer then prints and binds the publication.

22. Instructions for Proofreading

In reading proof the best results are obtained by one person reading aloud from the copy while another follows the reading on the proof. Corrections should be marked on the margin of the proof sheets opposite the indicated errors. They should not be made by writing over the print or between the lines; and, as a general rule, lines should not be drawn from the point at which the error occurs to the correction in the margin. In the rare cases when alterations are too long to be written in on the margin of the proof sheets, they should be typed on separate sheets or strips of paper which should be stapled or pasted to the proof sheets, the point of insertion in the text being carefully marked.

In correcting proof the following proofreader's marks should be used.

- Delete and close up
- Reverse
- Close up
- Insert space
- Paragraph
- Run in same paragraph
- Indent one em
- Move to left
- Move to right
- Move down
- Move up
- Even space
- Broken letter
- Straighten line
- Align type
- Insert marginal addition
- Insert comma
- Insert apostrophe
- Insert quotes
- Insert semicolon
- Insert colon
- Insert period
- Insert interrogation point
- Hyphen
- Em dash
- En dash
- Query to author
- Spell out
- Transpose
- Wrong font
- Set in bold face type
- Set in roman type
- Set in italic type
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- Let it stand
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