

Technical Report No. 56
STYLE AND FORMAT OF TECHNICAL REPORTS

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ABSTRACT

This technical report covers the style and format desired for IBP technical reports. All technical reports submitted to the IBP Grassland Biome project should be in this form before being submitted for final typing. This will help provide cleaner copies and faster service.

GENERAL INSTRUCTIONS

All manuscripts submitted must be typed on white paper either 8 1/2 x 11 inches or 8 x 10 1/2 inches. Type on only one side of the paper, and leave margins of 1 to 1 1/2 inches on all edges of the paper for editing marks.

Double-space the body or text of the paper, the title page, the abstract, the acknowledgment, and the footnote page. Single-space table titles, figure titles, and citations within the literature cited but double-space between the citations. Material within tables should be double-spaced if possible. However, if room does not permit, spacing may be adjusted to fit tables onto one page. Larger spacing, such as triple-spacing, should be used around equations and formulas which are put on lines by themselves.

Number all pages of the paper including tables, figures, and literature cited starting with the second page of the body of the paper; the first page of the body of the paper is page 1, but this is not shown. Numbers are centered at the top of the page with a dash on each side of the number, e.g., -2-. A triple-space follows before the body of the paper starts. The title page, the table of contents, and the abstract do not have Arabic numbers. Therefore, if they are numbered, use small Roman numerals, such as i, ii, starting with the table of contents as page ii.

Underlined items will be put in italics, so do not underline unless you want italics. This is used mainly for taxonomic names and for emphasis of words. Many foreign words which are used widely in English do not need to be italicized (for example, *in vitro*, *in vivo*, *a priori*, et al.).

Revise and edit your rough draft to conform to these details before the final typing. The errors must be found and corrected by someone; that someone should be the author. After the paper has been typed in final form, please check the following items:

(i) Read through the entire manuscript for typographical errors. In particular, go over names of people and places, citations, direct quotations, and technical terms (especially taxonomic names of organisms) since typists often have no way of checking these.

(ii) Be sure that all citations mentioned in the text of the paper are listed in the literature cited, and also that the literature cited does not have citations not found in the text.

(iii) Check the literature citations against the original sources for spelling, italics, dates, correct title, volume number, page numbers, etc.

(iv) Proofread all numbers, equations, and data in the text and the tables.

These details of style and form will be required for all future IBP papers. Authors should keep this technical report on hand when writing reports, and secretaries should refer to it while typing.

If you have any questions which are not answered by this paper, please refer to *Style Manual for Biological Journals* (Second Edition) published by the American Institute of Biological Scientists, commonly referred to as the AIBS Style Manual.

VARIOUS SECTIONS OF THE PAPER

Title Page

The title page should include the title of the paper, the author(s), the department, the institution, and the city and state. This page should be

double-spaced with more space (at least an inch) between the title and the author. All lines are centered across the page between margins. The lines of information are as follows: (i) title of the paper, (ii) author's name as he would ordinarily write it, (iii) the department of the author, (iv) the institution, and (v) the city and state. The title of the paper should be typed in all capital letters; however, everything else has the first letter of all major words capital and the rest lower case letters. Do not use abbreviations on this page.

If there are two or more authors, put all authors' names on the author line. Type the word *and* between the last two authors. On the next lines list the name of the department, the institution, and the city and state for the first author, single-spaced. Then double-space and list the same information (single-spaced) for the second author, etc., until each author has this information listed for him. However, between the last two authors type the word *and* on a line by itself and centered with a double-space both above and below it.

See Appendix I for two examples of title pages--one with a single author and one with three authors.

Table of Contents

This is not required, but is dependent upon the nature of the paper and the desires of the author. However, if you do include a table of contents, the page number for it is ii. The items to be listed in the table of contents will consist of all first-, second-, and third-order headings along with the page on which each heading starts. The page numbers should be lined up against the right margin so that the units column is straight all the way down the page. Double-space before each new first-order heading; however,

single-space all the second- and third-order headings within each of the major headings. The table of contents of this paper is a good example.

Abstract

This section should be typed on a separate sheet of paper which comes before the text or body. It should consist of only one relatively brief paragraph, and the title for the page should be centered in all capital letters, i.e., ABSTRACT. Again, see the abstract of this paper for an example.

If this page is numbered, it will be the next small Roman numeral after the one used on the last page of the table of contents, such as iii.

Body of the Paper

This page starts immediately with the text. It is double-spaced. Do not repeat the title of the paper or the author's name.

Headings. The section headings should be as follows:

(i) First-order headings or major headings appear in the center of the page in all capital letters:

FIRST-ORDER HEADING

(ii) Second-order headings come at the left margin with the first letter of all major words in capital letters and the rest lower case. These are on a line by themselves:

Second-Order Heading

(iii) Third-order headings start at the beginning of the first line of the paragraph after the paragraph indentation. They can be either in italics or underlined and are followed by a period, two spaces, and the paragraph. Only the first word of this heading starts with a capital letter:

Third-order heading. The paragraph starts immediately after this heading.

Abbreviations. Do not abbreviate the names of countries, states, or districts. There are three exceptions to this rule: USA and USSR for countries and Washington, D. C. These three abbreviations are acceptable.

The United States may be abbreviated as U.S. when referring to an institution or department which has United States as part of its title, i.e., U.S. International Biological Program. Also the United States Department of Agriculture may be abbreviated as USDA, which is commonly used.

Always have a comma both before and after such abbreviations as, i.e., e.g.,

Abbreviations of measurements are always used in the singular regardless of the size of the number they might describe; for example, 1 mm but also 3 mm. Units of measure are abbreviated only when used with numerals.

The word figure when referring to a specific figure number is always abbreviated Fig., i.e., Fig. 4. This abbreviation is also used in the figure title. Fig. is also used when referring to more than one figure, e.g., Fig. 5 and 6.

Abbreviations may be used in tables and figures. However, if they are unusual they should be defined in a footnote or in the legend.

Scientific names of organisms must be spelled out in the title of the paper and in the abstract. However, in the text the generic name is spelled out the first time it is used in combination with a specific name, but thereafter the generic name may be abbreviated to the first letter unless confusion may result. Generic names should never be abbreviated when used alone.

Appendix II consists of abbreviations of measurements and a few general abbreviations. These are only the more commonly used items. For additional abbreviations, refer to the AIBS Style Manual.

Measurements. All units of measure should be in the metric system and should be consistent throughout the paper, in tables, and in figures. The metric system is a decimal system of measures based on the meter as a measure of length, the hectare or square meter as a measure of area, the liter or cubic centimeter as a measure of volume or capacity, and the gram as a measure of weight or mass. The author should check these measurements and change them where necessary.

Footnotes. We would rather you try to avoid using footnotes in technical reports. However, if you must use them, remember footnotes are numbered consecutively from the beginning of the paper to the end. Do not use footnotes on the title page. Often, footnotes that would appear on the title page can be made into an acknowledgment.

If footnotes are used, list them all on a separate page using the title FOOTNOTES--centered on the page and in all capital letters. The numbers for footnotes should be raised, underlined, and followed by a slash, i.e., 1/. This same numbering system for footnotes is used both in the text and on the footnote page.

Type the footnotes for the text double-spaced on a separate page, with each entry headed by the number corresponding to the number of the citation in the text. The first letter of the second and all subsequent lines in each footnote should be directly under the first letter of the first line, not under the footnote number. Therefore, each footnote is actually a separate paragraph.

Footnotes to tables are independent for each table. They are numbered by lower case *letters* which are raised, underlined, and followed by a slash, i.e., a/. Footnotes to tables are typed directly beneath the table to which they correspond and are single-spaced with a double-space between footnotes.

For an example of a footnote page, see Appendix III. Appendix IV has a table which shows how to use footnotes in tables.

Citations. There are two ways to refer to published literature in the text depending on the structure of the sentence.

(i) This has been recorded by Thompson (1952) and by Jones et al. (1961).

(ii) This has been recorded for blue grama (Thompson 1952) and for buffalo grass (Jones et al. 1961).

[Note: We do not use a comma between the author and the year of publication as specified by the AIBS Style Manual. Therefore, we would type

(Mason 1963, Greeley 1960) *not* (Mason, 1963; Greeley, 1960).

This is clear enough either way but the reason we do not use the comma between the author and year is that for a series involving many names, years, and even *a*'s and *b*'s with years, it is much clearer if this comma is omitted.

For example:

(Black 1936; Hart et al. 1961^{a,b}; Brown 1948, 1951, 1955; Wallace, Green, and Scott 1966)

not

(Black, 1936; Hart et al., 1961^{a,b}; Brown, 1948, 1951, 1955; Wallace, Green, and Scott, 1966).

Omitting this comma also saves space.]

When there are three authors, list all of the names the first time they are cited as in Wallace, Green, and Scott (1966) above. After the

first time simply use Wallace et al. (1966). If there are four or more authors, cite this paper with the name of the first author and et al. in all cases, i.e., Watson et al. (1956).

The abbreviation et al. is never preceded by a comma and is always followed by a period. Also do not underline or italicize et al.

Unpublished literature should never be listed in the literature cited. These items are only mentioned in the text as J. B. Smith (personal communication) or (J. B. Smith, personal communication) or as R. E. Webster (unpublished data) or (R. E. Webster, unpublished data).

If an author or group of the same authors has written more than one paper in the same year, these items are noted by letters in italics immediately after the year in both the text and the literature cited, with the first item in the literature cited listed as *a*, i.e., Jones et al. (1966*a*) or (Watson 1956*a,b*). Because of the numerous articles written by the same author in the same year on the same general subject, it is almost impossible for typists to assign an *a* or a *b*; this information must be provided by the author.

Check that all text citations are present in the literature cited. This is very important.

Numbers. Following are nine rules on how to type numbers:

(i) Always use numerals when the number is followed by a unit of measure or its abbreviation. Examples: 1 year, 9%, 51 g.

(ii) Use words for numbers one through nine when preceding nouns other than those of measure. Examples: two times, five horses.

(iii) Numbers greater than nine are always typed as numerals. Examples: 14 sheep, 73 plants.

(iv) Ordinal numbers are treated in the same general manner as outlined above. First through ninth are spelled out unless used in a table. Higher ordinal numbers use numerals, e.g., 16th, 22nd, 43rd.

(v) If a series contains some numbers under 10 and others over 10, use numerals for all. Examples: 8 to 12 times; 4, 9, 11, and 15 horses, respectively.

(vi) If a number is quite large, a word may be substituted for part of the number. Example: 2.8 million instead of 2,800,000.

Also prefixes, such as milli-, centi-, kilo-, etc., may be added to the basic unit of measure to reduce the number used. Example: 10 cm instead of 100 mm.

Powers of 10 may also be used. Example: 10^3 times instead of 10,000

However, these suggestions under (vi) are optional, not required.

(vii) Write dates as May 4 or June 20 *not* May fourth, or June 20th.

(viii) Numerals are used in dates, page numbers, percentages, times, and specific designations of numbers. Examples: May 3, 1969; page 734; 34%; 11:30 AM; Group 5.

(ix) Never begin a sentence with a numeral. Try to start the sentence with a word; the alternative is spelling out the number.

Series. Punctuate all simple series with a comma, e.g., cows, sheep, and deer. Use semicolons for more involved series, such as elements within a series that have their own punctuation. For example, "The solution was heated, stirred, and cooled; the solid was discarded; and the gas was compressed and stored."

Complex series, however, such as enumerated sentences within a paragraph or paragraphs, should be numbered with small Roman numerals in

parentheses, such as (i), (ii), and (iii). This helps to avoid confusion with page numbers.

Quotations. Short quotations are typed within the paragraph and are double-spaced. However, quotations of 10 lines or more are indented from both margins equally and are single-spaced.

Quotations should be copied exactly from the original as it was published in regard to spelling, capitalization, punctuation, italics, etc. An error or irregularity in the original should be immediately followed by [sic] so the reader will know the material was quoted accurately. If you take the liberty of italicizing part of a quotation, indicate this in parentheses after the quotation, i. e., ". . ." (my italics). Note that this comes outside the quotation marks but before the period. Enclose any words you insert into a quotation in brackets. Add these brackets by hand if your typewriter does not have them since parentheses are not acceptable here.

Punctuate any quoted material according to these rules (from the AIBS Style Manual). The comma or period comes inside the final quotation mark, even if the comma or period is not part of the quotation. However, colons and semicolons appear outside the final quotation mark. Question marks go inside the final quotation mark if they belong to the quotation, but outside if they do not. Finally, an ellipsis (three spaced dots: . . .) is used to replace parts of the quotation which have been omitted in your paper; it will always come inside the quotation marks.

Nomenclature of organisms. Every organism has several names; the ones which concern us are the generic and specific names. Common names may be used parenthetically following the scientific name if desired. Never use the specific name alone when referring to a species; it must have the

generic name or the abbreviation thereof before it. However, the generic name may stand by itself. If the generic name is used by itself, it is never abbreviated.

The first letter of the generic name is capitalized; the rest of the letters are lower case. Specific names are not capitalized. The generic name may be abbreviated to include just the first letter of the name, which remains a capital, followed by a period. This can be done only if it is followed by a specific name, if it has been spelled out previously in the paper, and if the meaning will be clear with the abbreviation. These taxonomic names are also either italicized or underlined.

At some place in the report each name shall be followed by the authority, e.g., *Bouteloua gracilis* (H.B.K.) Lag. Generally this can be the first time the name appears or in a table which gives all names.

Always be sure to check these names for typographical errors after the paper has been typed. This is necessary as typists will often have no way of checking these names.

Equations and formulas. Write your equations so that they may be easily understood. For example, built-up fractions can be typed, as well as a slash between the parts of the fraction. That is, $\frac{a+b}{c+d}$ is typed as easily as $(a+b)/(c+d)$.

When typing equations, allow extra space around each equation. Also be sure that the numbers, letters, and symbols used in the equation or formula are clear and are in the proper alignment. This includes being certain to type or draw raised and lowered items where they belong. If there is a question in your mind about whether the position is clear, take the time to pencil in carets so the typist can be sure to type them in the

proper position: \wedge over the character means it is to be lowered, and \vee under the character means it is to be raised.

If your typewriter cannot raise or lower numbers, letters, and symbols, please draw them in neatly by hand. The same requirement applies to special symbols. In fact, extremely difficult equations may be drawn in entirely by hand, but be extremely explicit in the positions and the symbols. Be sure to insert these hand drawn equations into the text of the paper where they belong. For symbols and Greek letters, spell out the name of the letter in the margin so the typist will have no trouble identifying it; this is necessary and required only if drawn in by hand.

Avoid aligning raised letters or numbers over lowered ones. For example, type x_a^2 not x_a^2 .

Distinguish between the letters o and O and the number 0, the letter l and the number 1, the degree symbol $^\circ$ and the raised letter o and the raised number 0. Underline letters to be put into italics with a pencil or colored pen; do not underline with a typewriter. It is not recommended to use x as the multiplication sign (\times), but if you do, please indicate by lightly penciling in "mult.". Again for Greek letters and symbols, draw them carefully and insert the name in the margin, such as Gk. beta, to avoid typographical error. Since some capital Greek letters are the same as certain English letters, avoid using them as symbols. See Appendix V for the Greek symbols and other symbols available.

Large symbols can be typed from various combinations on a symbol board for such things as square root signs, long brackets, long parentheses, built-up fractions, etc. Be sure your equation is in the most easily readable form possible for you to devise.

Diacritical marks. Diacritical marks are used to distinguish letters phonetically. These are more common in foreign languages.

The most commonly used marks are:

<u>Mark</u>	<u>Name</u>	<u>Example</u>
´	acute accent	beauté
˘	grave accent	le congrès
ˆ	circumflex	bâtir
˜	tilde	Español
¨ or ¨	umlaut	für Anfänger

Grammar, spelling, and punctuation. Two items should be noted under grammar. First, contractions are never used in formal papers. Second, data is the plural form of datum, and therefore it requires a plural verb. This is a very common error; please try to catch it.

The author must correct spelling of names of people, places, publications, and especially taxonomic names, so please check these after the paper has been typed in final form. Also on the subject of spelling, percent when spelled out is one word, and aboveground and belowground are each one word, without hyphens, according to recent dictionaries.

Word division can occur only between two syllables of a word. Usually the break is quite obvious. However, if there is any question, please check with a dictionary so the division can be made in the appropriate place.

Concerning punctuation, use a comma both before and after abbreviations such as, i.e., e.g., An ellipsis consists of three spaced dots (. . .) when used in the text and also in equations. A period is added if an ellipsis occurs at the end of a sentence.

Acknowledgment

This is not a required section for technical reports, but will be required for journal publication. If you include it, the acknowledgment should appear on a separate page immediately after the body of the paper and should consist of a single paragraph. The title for this page should be ACKNOWLEDGMENT in all capital letters and centered on the page.

The acknowledgment can be used to acknowledge grants-in-aid, and items borrowed from published material. Also this can be used instead of the many footnotes commonly placed on the title page. If possible do not put footnotes on the title page, but make the footnote into an acknowledgment.

Footnote Page

As stated previously, all footnotes from the text should be typed double-spaced on a separate page in numerical order. Footnotes are denoted by a raised and underlined number followed by a slash, e.g., 3/. These numbers are typed the same in both the text and on the footnote page. In the body of the paper the footnote number comes immediately after the item to be footnoted without any spaces. However, on the footnote page the number comes first followed by two spaces and then the information part of the footnote. The first letter of every line after the first line should start immediately under the first letter of the first line of the footnote. The title of this page is FOOTNOTES centered and in all capitals. An example of a footnote page is given in Appendix III.

Footnotes to tables should be placed at the bottom of the page for the table to which they correspond; they do not go on a separate page. These footnotes should be denoted by superscript lower case letters also underlined

and followed by a slash. Letters are used in the tables since much of the material in the tables consist of numbers. See Appendix IV for an example of a footnote with a table.

Tables

Be sure your tables are in an intelligible form; It is extremely difficult for an editor to properly reorganize tables. Each table should appear on a separate page. The title for the table starts with the word Table (first letter capital and the rest lower case). Next comes the number of the table (Arabic numbers only are used here), a period, two spaces, and the title. The title is typed above the table, single-spaced if more than one line, and with each line after the first directly under the first letter of the title, *not* under the word "Table." The title is always followed by a period. When referring to a specific table in the text, be sure to use the table number as given in the table title, e.g., Table 4.

Tables should have a single rule below the title or above the box headings, a single rule below the box headings, and a single rule at the bottom of the table. Vertical lines should not be drawn in the table. Dashed lines may be used to separate subdivisions or different side headings in the body of the table. However, these may often be indicated by leaving more space between the subdivisions if space allows. Broken horizontal lines (lines not crossing the entire table) are used to indicate subdivisions of a box heading. Box headings are the names of the vertical columns which are enclosed between the two rules before the body of the table. Each column should have one of these headings; the first letter of every important word in these column headings is capitalized.

If possible, double-space the material in the body of the table. However, single-space the title, the footnotes, and the box headings. The only time the body of the table is not double-spaced is if space does not allow this.

Footnotes in tables are raised lower case letters which are underlined and followed by a slash, as b/. Table footnotes are independent for each table, and therefore they should be listed immediately below the table in alphabetical order. They are single-spaced with a double-space between footnotes.

There are several specific items to remember about the material in the body of the table:

- (i) Use italics for the scientific names of species just as you would in the text.
- (ii) Units of measure should be expressed below the box headings as the last line of the box heading whenever possible to avoid repetition in the body of the table. If all box headings use the same unit of measure, the measure may be centered under the solid line after the box heading with a dashed line on each side going across all columns concerned (See Appendix IV).
- (iii) Dates in tables should be of the form 8/4/69; do not use Roman numerals for months in dates.
- (iv) Do not use a dash or a minus sign to indicate lack of information or lack of observations; instead use "no data." This is different from an observed zero value, which is entered as a zero.
- (v) Data of equal length should be centered in the column; if not of equal length, center the longest item and align the rest on the decimal point or on a margin. If standard deviations are used,

align the data first on the \pm , then on the decimal point on each side of the \pm . Also when using the word "to" in ranges, center the word "to" and align the data on each side of it separately.

For example:

25.1 \pm 2.3		31 to 36.2
673 \pm 48		-22.3 to -11
6.23 \pm 0.15	and	-9 to 14
0.76 \pm 0.02		-2.4 to 1.7

- (vi) Units of measure should be in the metric system, and should be consistent with units in the text.

See Appendix IV for an example of a table involving most items discussed in this section.

As this paper is set up, the tables will come all together in numerical order after the footnote page. For journal articles this is the generally accepted procedure. However, tables may be inserted into the body of technical reports immediately after the page on which the specific table is first mentioned. All of the above rules still apply when the tables are inserted into the body of the paper, especially one table per page.

Figures

Again, these must be clear and intelligible. All figure titles should be typed on a separate page together in the proper order. The title of the page should be FIGURE TITLES centered and in all capital letters. The word "figure" when referring to a specific figure is abbreviated Fig. in both the text and in the figure titles, i.e., Fig. 6. Fig. is also the plural abbreviation. This figure title page precedes the figures. The figure titles are single-spaced with a double-space between titles. The title of a figure starts with Fig., followed by the Arabic number of the figure,

a period, two spaces, and the title which starts with a capital letter and is followed by a period. The first letter of all lines after the first line should be aligned under the first letter of the title *not* under the word "Fig." For an example of a figure title page, see Appendix VI.

All figures are placed in numerical order immediately after the figure title page. Each should be on a separate page, and each should have its figure title typed single-spaced at the bottom of the page just as it is typed on the figure title page. However, the figures may also be inserted into the body of the paper following the page on which they were first mentioned. In this case no figure title page is needed, but the figure titles will be placed on the bottom of each figure just as they would have been had they been put together in a section after the tables.

All legends appear on the same page with the figure and are a part of the drawing. Maps should include a scale of distance, and a directional indication on the figure. These figures should be drawn on white paper either 8 1/2 x 11 inches or 8 x 10 1/2 inches as is the rest of the paper. Use only black on white in your figures; *avoid using different colors*. Be sure to type or print clearly all information within the figure. If the figures are to be redrawn, directions should be explicit and easy to follow for the benefit of the draftsman. If possible, figures should be bold enough to be useful for transparencies. If photographs are used as figures, try to arrange them on as few pages as possible to reduce the amount of photocopy work needed.

Literature Cited

Literature citations are listed in alphabetical order and are referred to in the text by author and date only, i.e., Brown (1964) or (Brown 1964).

This section heading is typed in all capitals and is centered on the page. The information to be included in each citation is author, date, book or article title, publisher and address if a book, journal name, the total number of pages if a book, and the pertinent page numbers if a journal.

Citations are single-spaced within themselves, but double-spaced between citations. The second line of citations should be indented at least five spaces.

Now I will discuss in detail each item required in a citation, first for books and then for journals.

Book citations require:

1. Authorship.
2. Year of publication.
3. Title of book.
4. Edition if other than the first.
5. Publisher, city, and state or country.
6. Total number of pages.

Journal citations require:

1. Authorship.
2. Year of publication.
3. Title of article.
4. Title of publication or journal.
5. Volume number.
6. Pertinent pages.

Authorship. This applies to both books and journal articles.

Citations are listed alphabetically by author's last name, and if an author or the same group of authors have written several items, these are listed in order chronologically by date from the earliest to the most recent. If the same author's name or the same group of names appear more than once, type the names out for each citation; do not use a line to indicate the repetition of names.

The family name or surname precedes the first name and middle initial with a comma following the surname. If there is more than one author, this inversion holds only for the first author; the rest of the authors are listed first name first, middle initial, then surname. Names of the authors should appear in the literature cited exactly as they do in the

byline on the title page of the book or article. That is, if the first name of the author appears, use it; if only his initials appear, use them. The order of the names for co-authors is taken from the byline on the title page of the book; the names are to be in this same order in your literature cited.

Junior (Jr.) and II if used are indicated after the initials of inverted names. For example, T. W. Work, Jr. inverts to Work, T. W., Jr., and B. C. Jones II inverts to Jones, B. W. II. Compound or hyphenated names invert as regular names. For example:

<u>Examples</u>	<u>Inverts to</u>
J. L. Neal-Smith	Neal-Smith, J. L.
B. G. van Niel	Van Niel, C. B.
L. S. Krasil'nikov	Krasil'nikov, L. S.
J. J. De Smet	De Smet, J. J.

The authorship is always followed by a period.

Year of publication. This also applies to both books and journal articles.

Only the year itself is given here unless more than one book or paper was written by the same author(s) in a given year. Then, italicized lower case letters (*a, b, etc.*) should be used immediately after the year in both the text and the literature cited so as to distinguish between these citations. The year of publication is also followed by a period.

If several books or articles are written by the same author(s) but not in the same year, these citations are listed in chronological order by year from the earliest to the most recent.

Title. This also applies to both books and journals.

The title of the book or article must be exactly as it appears on the title page of the book or on the first page of the article. Only the first word of the title of a book or the title of an article is capitalized, and a period follows the title.

Edition. This applies to books only. The edition number follows the title and is abbreviated "ed." The number of the edition is also abbreviated, so if the book referred to is the second edition, 2nd ed. would follow the title.

Publisher and address. Be sure to give the complete and correct name of the publisher followed by a comma and the city. The state or country need not be listed if the city is quite well known or if the city is part of the publisher's name, as in Univ. California Press, Berkeley. If in doubt, include the state or country. This item applies only to books and is followed by a period.

Number of pages. For books the total number of pages is included as the last item in the citation. The number of pages is followed by the abbreviation for the word pages, e.g., 434 p.

Name of publication. This applies to articles only. After the title of the article comes the name of the publication or journal in which the article was published. These titles are often abbreviated according to the abbreviations given in the AIBS Style Manual (See Appendix VII for frequently used abbreviations).

One word titles are never abbreviated. Also abbreviations should not go beyond recognition. If in doubt, please spell out. This is absolutely essential for foreign publications, including those with titles of more than one word. In fact, do not abbreviate the title of foreign language

publications unless the abbreviation is used in the original title. For the name of the publications, remember to keep the same order of abbreviations as the complete words appear. Omit the articles, conjunctions, and prepositions from the names of English language publications.

Capitalize the initial letter of each abbreviation, place a period after each abbreviation, and space once between each abbreviation or word. Diacritical marks are not necessary in these abbreviations. No period is used after the name of the publication if a volume number appears.

Volume number and pages. All of these numbers appear in Arabic numbers and follow one space after the name of the publication or periodical. Issue numbers are not necessary if the volume number is given. A colon separates the volume number from the page numbers, and a hyphen is used for ranges of page numbers, i.e., 51:223-227. Any special series number, followed by a comma, precedes the volume number, e.g., Ser. 6, 11:311-323, VI, 11:311-323, or F, 11:311-323. Only the inclusive page numbers of the article are given. For an article which has been interrupted and is continued in another part of the journal, the citation indicates this as 42:1-80, 92, 96.

For commonly used abbreviations used in literature citations refer to Appendix VII. For an example of some special types of literature citations, see Appendix VIII; and for Literature Cited as it should appear, refer to Appendix IX.

MAKING CORRECTIONS





Minor Corrections

Try to avoid correcting the final copy. However, if corrections are necessary, type or print legibly above the line concerned. If the correction

will not change the number of spaces on a line, a lightly penciled correction should be used since the entire page may not have to be retyped. Do not attach small slips of paper to pages since they become lost easily. Instead, type the information onto a regular size sheet of paper. This is especially necessary for lengthy insertions. If this typing or retyping leaves a page partly filled, this is acceptable. Inserted pages may be numbered with a number and a letter, e.g., 3a. This page should follow page 3. However, try to avoid this.

Margins are for the editor's and typist's notes; do not use them excessively for your notes except to identify Greek letters and symbols.

For minor corrections several marks may be used to tell the typist to change something. The following are commonly used proof marks.

<u>Mark</u>	<u>Description</u>
.	Period
,	Comma
-	Hyphen
:	Colon
;	Semicolon
' or 	Apostrophe
" or 	Quotations
ab or tr	Transpose
	Delete - Take out
	Close up
^	Caret--Something to be inserted here
()	Parentheses
[]	Brackets
tr	Transpose

¶	Paragraph
No ¶	No paragraph
- or cap	Capitalize
l.c. or l	Lower case
_____	Italicize
∨ b	Raise letter or figure
∧ 2	Lower letter or figure
spell or ②	Spell out, if figure
STET	Nullifies a previous order; delete or omit a word or passage

Major Corrections and Revisions

All papers will be subject to review for style and form. Papers needing revision will be returned to the author(s) and should be revised and returned promptly. A letter of explanation will accompany any manuscript returned so you will know what items need to be revised. An example of the letter to be sent out is given in Appendix X.

Common major problems in papers are listed below, so please be sure to check these items since they are the major reasons for papers being returned:

- (i) The paper lacks an abstract.
- (ii) The taxonomic names for organisms are misspelled, inconsistent, or are not abbreviated correctly.
- (iii) Authorities for scientific names are omitted.
- (iv) Symbols or Greek letters cannot be read or the position of letters and numbers cannot be determined.
- (v) Data are not in metric units.

- (vi) Time base is not specified (e.g., MST, MDST, GMT).
- (vii) Tables are not in the simplest or correct form.
- (viii) Tables lack complete information.
- (ix) Figures are illegible, inaccurate, lack enough information, or will not reproduce well in black and white.
- (x) There is a difference between the text and the literature cited in the spelling of the author's name for a citation.
- (xi) There is a difference between the text and the literature cited in the date of publication for a citation.
- (xii) There are one or more citations in the body of the paper which are missing in the literature cited.
- (xiii) There are one or more citations in the literature cited which are not referred to in the body of the paper.
- (xiv) The literature cited lacks titles of books and articles.
- (xv) The literature cited lacks some publication dates.

SUMMARY

This technical report has been set up in the same order that the various parts of other reports should have when typed in final form. Therefore, it should be quite easy to follow. Also if only one section is giving you trouble, you can go directly to that section without having to read the entire paper.

All reports submitted to the Grassland Biome office should be in this form to be acceptable. This will save time for the typing staff so that reports can be ready for reproduction and distribution sooner.

APPENDIX I

Title Page

ASPECTS OF QUANTITATIVE TRAINING
IN THE NATURAL RESOURCE SCIENCES

George M. Van Dyne
Natural Resource Ecology Laboratory
Colorado State University
Fort Collins, Colorado

APPENDIX I (Continued)

Title Page

ESOPHAGEAL VS. FECAL SAMPLING FOR THE BOTANICAL
DETERMINATION FOR STEER DIETS

M. Vavra, R. W. Rice, and R. M. Hansen

Animal Science Department
University of Wyoming
Laramie, Wyoming

Animal Science Department
University of Wyoming
Laramie, Wyoming

and

Department of Range Science
Colorado State University
Fort Collins, Colorado

APPENDIX II

Abbreviations--Measurements and General

These are only the more commonly used abbreviations. For other abbreviations, please refer to the AIBS Style Manual. *Metric units will be used whenever possible.*

<u>Word</u>	<u>Abbreviation</u>	<u>Word</u>	<u>Abbreviation</u>
acre	spell out	day	spell out
afternoon (<i>post meridiem</i>)	PM	deci (prefix, 10^{-1})	d-
and others (<i>et alii</i>)	et al.	decimeter (0.1 m)	dm
<i>anno Domini</i>	A. D.	degree	°
<i>ante meridiem</i> (before noon)	AM	dollar	spell out or \$ with numerals
antilogarithm	antilog	dozen	doz
approximate	approx	dry weight	dry wt
arc tangent	arc tan	east	E
average (mean, median, or mode are preferred)		<i>et alii</i> (and others)	et al.
before noon (<i>ante meridiem</i>)	AM	<i>et cetera</i> (and the rest)	etc.
calorie(s) (small, gram-calorie)	cal	Fahrenheit (degrees Fahrenheit)	F °F
Calorie(s) (large, kilogram calorie)	kcal	female	♀
Celsius (Centigrade) (degrees Centigrade)	C °C	figure(s)	Fig.
centimeter(s)	cm	foot or feet	ft
centimeters, squared	cm ²	for example (<i>exempli gratia</i>)	e.g.
cubic centimeter(s)	cm ³ , cc	forenoon	AM
cubic foot (feet)	ft ³	gallon(s)	gal
		grain(s)	gr
		gram(s)	g

APPENDIX II (Continued)

<u>Word</u>	<u>Abbreviation</u>	<u>Word</u>	<u>Abbreviation</u>
gravity, centrifugal	<i>g</i>	mile(s)	spell out
hectare(s)	ha	miles per hour	mph
hour(s)	spell out or hr in tables	milli (prefix, 10^{-3})	m
hydrogen ion concentration, negative log of	pH	milligram(s)	mg
<i>id est</i> (that is)	i.e.	milliliter(s)	ml
inch(es)	spell out	millimeter(s)	mm
kilo (prefix, 10^3)	k	minimum	min
kilocalorie(s)	kcal	minute(s)	spell out or min in tables
kilogram(s)	kg	month	spell out
kilometer(s)	km	morning (<i>ante meridiem</i>)	AM
liter(s)	spell out	nano (prefix, 10^{-9})	n
logarithm (common, base 10) <i>in formulas</i>	log, \log_{10}	north, northwest	N, NW
logarithm (natural base <i>e</i>) <i>in formulas</i>	ln, \log_e	number (<i>numero</i>) in enumeration	no.
male	♂	ounce	oz
maximum	max	page(s)	p.
meter(s)	m	parts per million	ppm
meter(s), cubic	m^3	percent	% (with number)
meter(s), square	m^2	<i>post meridiem</i> (afternoon)	PM
micro (prefix, 10^{-6})	μ	precipitation (in tables)	ppt
microgram (do not use gamma, γ)	μg	pound(s) (<i>libra</i>)	lb.
micron(s) (10^{-3} mm)	μ	relative humidity	spell out
		revolutions per minute	rpm, rev/min

APPENDIX II (Continued)

<u>Word</u>	<u>Abbreviation</u>	<u>Word</u>	<u>Abbreviation</u>
second(s) (time)	spell out or sec in tables	ton	spell out
second(s) (angular measure)	"	versus (against)	vs.
sine	sin	volt	v
south, southwest	S, SW	volume (with numerals in tables)	vol
square	sq	watt	w
square centimeters	cm ²	week(s)	spell out or wk in tables
square foot	ft ²	weight	wt
standard deviation	SD	west	W
standard error	SE	yard(s)	spell out or yd in tables
tangent	tan	year(s)	spell out or yr in tables
temperature	spell out or temp in tables		
that is (<i>id est</i>)	i.e.		

APPENDIX III

Footnote Page

FOOTNOTES

- 1/ Major support was provided by the United States Department of Agriculture and S-43 regional project on Animal Production.
- 2/ Associate Professor of Animal Science, College of Agriculture, Colorado State University, Fort Collins, Colorado.

APPENDIX IV

Table

Table 6. A comparison of availability, selection, and seasonal diet of black-tailed jackrabbits (*Lepus californicus*).

Plant Groups	Total Vegetation in Area	Total Yearly Diet of Black-Tailed Jackrabbits	Composition of Diets ^{a/}			
			Summer	Fall	Winter	Spring
----- Percent -----						
Grasses	85	45				
<i>Agropyron smithii</i>			15	17	36	42
<i>Bouteloua gracilis</i>			18	12		31
Other grasses			4			
Unidentified grasses				2		
TOTAL			59	32	29	77

Forbs	12	40				
<i>Kochia scoparia</i>			11	26	31	12
<i>Plantago purshii</i>				5		
Other forbs			7			
TOTAL			38	48	39	22

Shrubs	3	15				
<i>Artemisia filifolia</i>				14		
<i>Opuntia</i> spp. ^{b/}			4		23	
Other shrubs						1
TOTAL			3	18	29	1

a/ The composition of the diets of black-tailed jackrabbits was taken by measuring the amount of food eaten by the animals. However, the composition of diets given here is in percentages.

b/ This group of shrubs consisted mainly of *Opuntia humifusa*.

APPENDIX V

Greek Alphabet and Symbols

Name of Letter	Capital	Small	Latin and English Equivalent
alpha	A	α	a
beta	B	β	b
gamma	Γ	γ	g (or n)
delta	Δ	δ	d
epsilon	E	ε	e
zeta	Z	ζ	z
eta	H	η	\bar{e}
theta	Θ	θ	th (or t)
iota	I	ι	i
kappa	K	κ	c (or k)
lambda	Λ	λ	l
mu	M	μ	m
nu	N	ν	n
xi	Ξ	ξ	x
omicron	Ο	ο	o
pi	Π	π	p
rho	Ρ	ρ	r (or rh)
sigma	Σ	σ	s
tau	Τ	τ	t
upsilon	Υ	υ	y (or u)
phi	Φ	φ	ph (or f)
chi	Χ	χ	ch
psi	Ψ	ψ	ps
omega	Ω	ω	\bar{o}

Other symbols which are available include:

+ + † ‡ { } α ∞ ‹ › ∫ ∫ ∫ ∫ ∫ ∫ ∫ ∫ ∫ ∫
 ± ∴ × ∙ ∞ ≈ Γ ∆ ∇ √ | ∞ ∇ ∞ ∞ ∞ ∞ ∞ ∞

Many of these symbols may be combined to make larger symbols if desired.

APPENDIX VI

Figure Title Page

FIGURE TITLES

- Fig. 1. A generalized property of the grassland ecosystem is plotted against time to show the importance of examining the time scale.
- Fig. 2. Flow chart outline for the development and use of simulation models in the area of natural resource management.
- Fig. 3. Map of the Pawnee Site.

APPENDIX VII

Abbreviations for Literature Citations

These abbreviations are the more commonly used ones. For additional abbreviations, please refer to the AIBS Style Manual.

The abbreviation itself appears in large type with a space after it.

Abstr act	Cent ral-	Fed eral-	Microbiol og-
Acad em-	Chem i-	Forest-	Nat ion-
Admin istr-	Chron i-	Found ation	Natur-
Advance-	Coll ege	Gen eral-	Observ-
Agr icult-	Comm ission	Geogr aph-	Oceanogr aph-
Agr ar-	Comm ittee	Geol og-	Offic i-
Agron om-	Co mpany	Hist or-	Org anic-
Amer ica-	Comp ar-	Hort icult-	Orig inal-
Anal-	Conf erence	Hydrol og-	Phys ics
Anat om-	Congr es-	Illus tr-	Physiol og-
Anim al-	Conserv-	Inc orporated	Prelim in-
Ann al	Coop erat-	Ind ustr-	Proc eeding
Announce ment	Corp oration	Inst itut-	Prof ession-
Annu al	Dep artment-	Intern al	Proj ect-
Append ix	Dig est-	Int ernational	Pub lication
Appl ied	Dir ee-	J ournal	Publ isher
Ass ocia-	Diss erta-	Lab orator-	Publ ishing
Atmos pher-	Doc ument-	Lect ur-	Quant itativ-
Bacteriol og-	Ecol og-	Limol og-	Quart erly
Bibliogr aph-	Econ om-	Lit eratur-	Radiobiol og-
Biochem-	Ed ition	Mag azin-	Rec ord
Biol og-	Ed itor	Mammal og-	Regist r-
Biomed ical	Educ a-	Manage ment	Rep ort
Biophys ic-	Eng ineer-	Math emat-	Pes earch
Bull etin-	Entomol og-	Mech anic-	Rev iew
Bur eau	Exp eriment-	Med ic-	Roy al
Centen nial	Ext ension	Method-	Sci en-

APPENDIX VII (Continued)

Sect io-	Tech ni-
Ser ies	Technol og-
Soc ial-	Trans action
Soc iet-	Transl ation
Spec ial-	USSR <i>Union of Soviet</i>
Sta tion	<i>Socialist Republic</i>
Statis-	UK <i>United Kingdom</i>
St reet	UN <i>United Nations</i>
Sum mar-	US <i>United States</i>
Suppl ement-	USA <i>United States of America</i>
Surv ey	Univ ersit-
Symp os-	Vol ume
Taxonom-	Zool og-

APPENDIX VIII

Special Literature Citations

Book:

Pielou, E. C. 1969. An introduction to mathematical ecology. Wiley-Interscience, New York. 286 p.

Journal:

Marti, C. D. 1969. Some comparisons of the feeding ecology of four owls in north-central Colorado. *Southwestern Natur.* 14:163-170.

Edition:

Pirt, S. J. 1961. *Fungi in the soil.* 2nd ed. Academic Press, New York. 321 p.

University Press:

Merchant, C. L. 1958. *Simulation of an aquatic ecosystem.* Univ. Colorado Press, Boulder. 872 p.

One word journal name: (These are never abbreviated.)

Rice, E. L. 1964. Inhibition of nitrogen-fixing and nitrifying bacteria by seed plants. *Ecology* 45:824-837.

Translation:

Kaufmann, A. 1967. *Graphs, dynamic programming, and finite games.* Academic Press, New York. [Transl. from French by H. C. Sneyd. 1964. *Methodes et models de la recherche operationelle.* Vol 2. Dunod, Paris.] 484 p.

Abstract:

Nagy, J. G., G. Vidacs, and G. M. Ward. 1962. In vitro studies on alfalfa hay substrate using deer, cows, sheep, and cattle as rumen fluid donor. *J. Dairy Sci.* 45:69. (Abstr.)

APPENDIX VIII (Continued)

Book Review:

Baldwin, P. H. 1962. Book Review: Morphological differentiation and adaptation in the Galapagos finches. R. I. Bowman, 1961. Univ. California Pub. 58. 302 p. *In* Wilson Bull. 74:295-297.

Proceedings:

Stewart, B. A., L. K. Porter, and F. G. Viets. 1966. Sulfur requirements for decomposition of cellulose and glucose in soil. Soil Sci. Soc. Amer., Proc., 30:453-456.

Transactions:

Shtina, E. A., E. M. Pankratova, G. N. Perminova, A. N. Tretjakova, and L. A. Yang. 1968. An introduction to cellular biology. Int. Congr. Soil Sci., Trans. 7:130-142.

Dissertation:

Rybak, J. P. 1960. Soil microfungi of a Nebraska grassland. Ph.D. Diss. Univ. Nebraska, Lincoln. 203 p.

Latin name in title of article:

Hudson, H. J. and J. Webster. 1958. Succession of fungi on decaying stems of *Agropyron repens*. British Mycol. Soc., Trans. 41:165-177.

Paper in a series:

Hansen, R. M. and J. T. Flinders. 1969. Food habits of North American hares. Range Sci. Dep. Sci. Ser. No. 1. Colorado State University, Fort Collins. 18 p.

Part of a book:

Apinis, A. E. 1963. Thermophilous fungi of coastal grasslands, p. 427-437. *In* J. Doeksen and J. van der Drift [ed.] Soil organisms. North Holland Publ. Co., Amsterdam. 586 p.

APPENDIX VIII (Continued)

Two or three papers by the same author written in the same year:

Van Dyne, G. M. 1965^a. Chemical composition and digestibility of range plants from annual range and from pure-stand plots. *J. Range Manage.* 18:332-337.

Van Dyne, G. M. 1965^b. Application of some operations research techniques to food chain analysis problems. *Health Phys.* 11:1511-1519.

Van Dyne, G. M. 1965^c. Regress: a multiple regression and correlation program with graphic output for model evaluation. Oak Ridge Nat. Lab. (Tennessee) TM-1288. 54 p.

[Note: You *must* indicate in the body of the paper each time Van Dyne 1965 is cited, whether it is 1965^a, 1965^b, or 1965^c.]

Two or three papers by the same author written in different years:

Odum, E. P. 1945. The concept of the biome as applied to the distribution of North American birds. *Wilson Bull.* 57:191-201.

Odum, E. P. 1959. *Fundamentals of ecology.* W. B. Saunders Co., Philadelphia. 546 p.

Odum, E. P. and J. D. Perkinson, Jr. 1951. Relation of lipid metabolism to migration in birds: Seasonal variation in body lipids of the migratory white-throated sparrow. *Phys. Zool.* 24:216-230.

Odum, E. P., C. E. Connell, and L. B. Davenport. 1962. Population energy flow of three primary consumer components of old-field ecosystems. *Ecology* 43:88-96.

Entire citation in a foreign language:

Verlaine, P. W. 1968. L'écologie du faucon en Bretagne. *Le Bulletin Annuel de l'Académie Française* 82:140-176.

APPENDIX IX

Literature Cited

LITERATURE CITED

- Apinis, A. E. 1963. Thermophilous fungi of coastal grasslands, p. 427-437. In J. Doeksen and J. van der Drift [ed.] Soil organisms. North Holland Publ. Co., Amsterdam. 586 p.
- Baldwin, P. H. 1962. Book Review: Morphological differentiation and adaptation in the Galapagos finches. R. I. Bowman. 1961. Univ. California Pub. 58. 302 p. In Wilson Bull. 74:295-297.
- Hansen, R. M. and J. T. Flinders. 1969. Food habits of North American hares. Range Sci. Dep. Sci. Ser. No. 1. Colorado State University, Fort Collins. 18 p.
- Hudson, H. J. and J. Webster. 1958. Succession of fungi on decaying stems of *Agropyron repens*. British Mycol. Soc., Trans. 41:165-177.
- Kaufmann, A. 1967. Graphs, dynamic programming, and finite games. Academic Press, New York. [Transl. from French by H. C. Sneyd. 1964. Methodes et models de la recherche operationelle. Vol 2. Dunod, Paris.] 484 p.
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- Nagy, J. G., G. Vidacs, and G. M. Ward. 1962. In vitro studies on alfalfa hay substrate using deer, cows, sheep, and cattle as rumen fluid donor. J. Dairy Sci. 45:69. (Abstr.)
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- Stewart, B. A., L. K. Porter, and F. G. Viets. 1966. Sulfur requirements for decomposition of cellulose and glucose in soil. *Soil Sci. Soc. Amer., Proc.*, 30:453-456.
- Van Dyne, G. M. 1965^a. Chemical composition and digestibility of range plants from annual range and from pure-stand plots. *J. Range Manage.* 18:332-337.
- Van Dyne, G. M. 1965^b. Application of some operations research techniques to food chain analysis problems. *Health Phys.* 11:1511-1519.
- Van Dyne, G. M. 1965^c. Regress: a multiple regression and correlation program with graphic output for model evaluation. Oak Ridge Nat. Lab. (Tennessee) TM-1288. 54 p.
- Verlaine, P. W. 1968. L'écologie du faucon en Bretagne. *Le Bulletin Annuel de l'Académie Française* 82:140-176.

APPENDIX X

Letter of Explanation

Dear Sir:

Please find enclosed the report you recently sent to us. The report is not acceptable in its present form for the reasons indicated below. It should be revised and returned as soon as possible.

Sincerely Yours,

George M. Van Dyne
Biome Director

Please revise the following:

- The paper lacks an abstract.
- Taxonomic names of organisms are misspelled, inconsistent, or not abbreviated correctly.
- Authorities for scientific names are omitted.
- Equations contain unintelligible symbols or positions of letters and numbers are not clear.
- Data are not in metric units.
- Time base is not specified.
- Tables are not in the simplest form possible.
- Tables are incomplete.
- Figures are illegible, inaccurate, lack information, or will not reproduce well.
- There are differences in spelling of authors' names between the text and the literature cited.
- There are differences in dates of publication between the text and the literature cited.
- There are citations in the body of the paper which are not listed in the literature cited.
- There are citations in the literature cited which cannot be found in the body of the paper.
- The literature cited has no titles of books or articles.
- The literature cited has missing years of publication.