Words and Expressions to Avoid

Jargon	*Preferred Usage*
a considerable amount of	much
a considerable number of	many
a majority of	most
a number of	many
a small number of	a few
absolutely essential	essential
accounted for by the fact	because
adjacent to	near
along the lines of	like
an example of this is the fact that	for example
an order of magnitude faster	10 times faster
are of the same opinion	agree
as a consequence of	because
as a matter of fact	in fact (or leave out)
as is the case	as happens
as of this date	today
as to	about (or leave out)
at a rapid rate	rapidly
at an early date	soon
at an earlier date	previously
at some future time	later
at the conclusion of	after
at the present time	now
at this point in time	now
based on the fact that	because
by means of	by, with
causal factor	cause
completely full	full
consensus of opinion	consensus
considerable amount of	much
definitely proved	proved
despite the fact that	although
due to the fact that	because
during the course of	during, while
during the time that	while
elucidate	explain

Jargon	*Preferred Usage*
enclosed herewith	enclosed
end result	result
entirely eliminate	eliminate
eventuate	happen
fabricate	make
fatal outcome	death
fewer in number	fewer
finalize	end
first of all	first
following	after
for the purpose of	for
for the reason that	since, because
from the point of view of	for
future plans	plans
give an account of	describe
give rise to	cause
has been engaged in a study of	has studied
has the capability of	can
have the appearance of	look like
having regard to	about
impact (v.)	affect
important essentials	essentials
in a number of cases	some
in a position to	can, may
in a satisfactory manner	satisfactorily
in a very real sense	in a sense (or leave out)
in almost all instances	nearly always
in case	if
in close proximity to	close, near
in connection with	about, concerning
in many cases	often
in my opinion it is not an unjustifiable assumption that	I think
in order to	to
in relation to	toward, to
in respect to	about
in some cases	sometimes
in terms of	about
in the absence of	without
in the event that	if
in the not-too-distant future	soon
in the possession of	has, have
in view of the fact that	because, since
inasmuch as	for, as
incline to the view	think
initiate	begin, start
is defined as	is
it has been reported by Smith	Smith reported
it has long been known that	I haven't bothered to look up the reference
it is apparent that	apparently
it is believed that	I think
it is clear that	clearly

Jargon	*Preferred Usage*
it is clear that much additional work will be required before a complete understanding	I don't understand it
it is doubtful that	possibly
it is evident that *a* produced *b*	*a* produced *b*
it is generally believed	many think
it is my understanding that	I understand that
it is of interest to note that	(leave out)
it is often the case that	often
it is suggested that	I think
it is worth pointing out in this context that	note that
it may be that	I think
it may, however, be noted that	but
it should be noted that	note that (or leave out)
it was observed in the course of the experiments that	we observed
join together	join
lacked the ability to	couldn't
large in size	large
let me make one thing perfectly clear	a snow job is coming
majority of	most
make reference to	refer to
militate against	prohibit
needless to say	(leave out, and consider leaving out whatever follows it)
new initiatives	initiatives
of great theoretical and practical importance	useful
of long standing	old
of the opinion that	think that
on a daily basis	daily
on account of	because
on behalf of	for
on no occasion	never
on the basis of	by
on the grounds that	since, because
on the part of	by, among, for
our attention has been called to the fact that	we belatedly discovered
owing to the fact that	since, because
perform	do
place a major emphasis on	stress
pooled together	pooled
presents a picture similar to	resembles
prior to	before
protein determinations were performed	proteins were determined
quantify	measure
quite a large quantity of	much
quite unique	unique
rather interesting	interesting
red in color	red

Jargon	*Preferred Usage*
referred to as	called
relative to	about
resultant effect	result
serious crisis	crisis
smaller in size	smaller
so as to	to
subject matter	subject
subsequent to	after
sufficient	enough
take into consideration	consider
terminate	end
the great majority of	most
the opinion is advanced that	I think
the predominate number of	most
the question as to whether	whether
the reason is because	because
the vast majority of	most
there is reason to believe	I think
this result would seem to indicate	this result indicates
through the use of	by, with
to the fullest possible extent	fully
ultimate	last
unanimity of opinion	agreement
until such time	until
utilize	use
very unique	unique
was of the opinion that	believed
ways and means	ways, means (not both)
we have insufficient knowledge	we don't know
we wish to thank	we thank
what is the explanation of?	why
with a view to	to
with reference to	about (or leave out)
with regard to	concerning, about (or leave out)
with respect to	about
with the possible exception of	except
with the result that	so that
within the realm of possibility	possible

Sermons on brevity and chastity are about equally effective. Verbal promiscuity flows from poverty of language and obesity of thought, and from an unseemly haste to reach print—a premature ejaculation, as it were.

—Eli Chernin

has

pointed

logic

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How to write scientific papers - Prof. Dr. Ruben Sommaruga

Noviembre 2000 Facultad de Ciencias
Universidad de la República
Montevideo-Uruguay

Program

1-Introduction (History, IMRAD system, peer-review system, primary scientific publication)
2-Solving common problems in scientific writing:
  a-Use of hyphens, commas, colons and semicolons
  b-Problems with comma-splices and run-ons
  c-Avoiding fragments or incomplete sentences
  d-Problems with subject-verb agreement
  e-Problems with pronoun reference and pronoun case
  f-Problems of parallelism
  g-Spelling problems (homonyms)
  h-American and British spelling
  i-Capitalization
  j-Geographical use of "the"
  k-Latin abbreviations most commonly used
  l-Use of numbers vs. words
  m-Use of numbers, dates and map references
  n-The SI of units and rules for its use
  o-The use of "a" and "an" (what matters is the *sound*)
  p-The use of apostrophes, and of it's and its
3-Planning: when, what and where to write (instructions to authors, respecting the journal' s style, criteria for selecting a journal)
4-Deciding the authorship
5-Writing the first draft: starting with the end
6-Structure of papers
7-How to prepare a good title? (Keywords)
8-The abstract (use of the active voice)
9-The introduction
10-Mastering the structure of paragraphs
11-Academic words used for reporting and connecting ideas
12-Material and Methods
13-Results (preparing tables and figures, common errors, legends, presentation)
14-Discussion
15-The appropriate tense for each section
16-Avoiding plagiarism
17-Word usage in scientific writing
18-Words and expressions to avoid; being concise
19-Why citations are important?
20-The citation-sequence system
21-The Harvard or author-date system
22-Journal abbreviations
23-Preparing the final version before submitting the manuscript (page number, line separation, line numbering, margins, good writing *is re-writing*, correction steps by colleagues and friends)
24-Submitting the final version (hardcopies, diskette, covering letters)
25-What will happen to your manuscript? The different type of editors (manager editor, chief editor, regional editor, specific editors); ethical obligations of reviewers; which points will a reviewer check; examples of review instructions for different journals
26-How should the comment for the authors look like?
27-Possible editorial decisions, and how to deal with them; answering to the reviewers
28- Understanding the symbols used to correct manuscripts and page (galley) proofs
29- Some tips to write a good scientific project

Exercises:

1-Learning to use commas
2-Identifying grammatically incomplete sentences (fragments)
3-Learning to identify problems of subject-verb agreements
4- Pronoun reference
5- Pronoun case
6- Parallelism
7- Problem words (affect, effect, words with *ie* or *ei*)
8-Ethics in Science
9-Writing an abstract
10-Eliminating jargon, oxymorons, and unnecessary words
11-Learning to use proofreaders' marks
12-Reshaping sentences
13-Correcting a manuscript

Recommended literature:

Alley, Michael. 1996. The Craft of Scientific Writing. Third edition, Springer Verlag, Berlin.
Council of Biology Editors. 1994. CBE Style Manual: A Guide for Authors, Editors, and Publishers in the Biological Sciences. Sixth edition, Cambridge Univ. Press., London [*Baufakultätsbibliothek*]
Day, R. A. 1988. How to write and publish a scientific paper. Third edition, Cambridge University Press, New York.
Day, R. A. 1995. Scientific English: a guide for scientists and other professionals. Second edition, Oryx Press, Phoenix.
Geever, J. C. and P. McNeill. 1997. The Foundation Center's Guide to Proposal Writing. New York: The Foundation Center. See: *http://fdncenter.org/onlib/shortcourse/prop1.html*
Gopen, G.D. and J.A. Swan. 1990. The science of scientific writing. American Scientist, 78: 550-558.
Miner, L. E., J. T. Miner and J. Griffith. 1998. Proposal planning and writing. Second edition, Oryx Press, Phoenix.
Pechenik, J. and B. Lamb. 1994. How to write about biology. Second edition, HarperCollins Publ. London.
Weiss, E.H. 1990. 100 Writing remedies: practical exercises for technical writing. Oryx Press, Phoenix.

What is a primary scientific publication?

The Council of Biology Editors (CBE) supports the following definition:

An acceptable primary scientific publication must be the first disclosure containing sufficient information to enable peers to ***1)*** *assess observations,* ***2)*** *repeat experiments, and* ***3)*** *to evaluate intellectual processes; moreover, it must be available to the scientific community without restriction, and available for regular screening by one or more of the major recognized indexing services (e.g., Current Contents, Science Citation Index, Biological Abstracts, Chemical Abstracts, Index Medicus, Excerpta Medica, Bibliography of Agriculture, etc.*

GOOD ORGANIZATION IS THE KEY TO GOOD WRITING

An effective way to proceed in writing a scientific paper is to answer the following four questions:

1) What is the problem? Your answer is the Introduction.

2) How did you study the problem? Your answer is the Materials and Methods.

3) What did you find? Your answer is the Results.

4) What do these findings mean? Your answer is the Discussion.

Hyphens

Hyphens are supposed to keep us from misreading things and show us how words in complex phrases relate to each other. Hyphens show that a pair of words is acting as a unit and must be read that way.

1) *Although styles vary on this, do not hyphenate the common prefixes such as pre, anti, multi, and so on (unless it spells some other word or just looks* awkward). *However, do hyphenate prefix words such as self-.*

self-lubricating	nonprescription drugs
multistep reaction	precooked foods
antibotulism agent	anti-icing
nonmalarial areas	subnuclear
reusable	mid-1970s
re-sent	

2) *Hyphenate a unit modifier ("5-year" in the first example) made up of a number followed by a unit of measurement:*

5-year grant 10-month period
20-megabyte memory 3.5-inch diskette
4-liters bottle

3) *Hyphenate an elliptical form of a longer phrase that is acting as a unit modifier:*

below-average rainfall   warm-up period
built-in scale   on-board timer
start-up costs   pay-off period
in-service accuracy   written-out number

4) *Hyphenate a verb and a non-verb element acting as a unit:*

drought-producing system   water-repellent fabric
nutrient-rich waters   water-soluble reactants
government-sponsored programs   health-related costs
pressure-induced melting   caffeine-containing substances

5) *Don't hyphenate units in which the first word ends in -ly:*

highly developed country
fully equipped computer

Commas

Punctuation style in technical writing is based on the structure of the sentence. Use a comma after all introductory elements. Any element, regardless of the length, coming before the main clause should be punctuated with a comma. (The main clause is that core part of a sentence that makes it a complete sentence; that is, it expresses a complete thought.)

Examples:

When an atom acquires enough energy to leave its orbit, the atom is positively charged.

Because there is no belt of doldrums in the Atlantic south of the equator, hurricanes do not usually occur there.

Between 40° and 50° W and just south of 10° N in the western end of the doldrums belt, calms do occur with frequency, and hurricanes originate there with great frequency.

In 1831, Michael Faraday discovered that if a magnet was moved in the vicinity of a coil, a current could be induced in the coil. Using this concept, Faraday arrived at a relation between the changing flux and the induced electromagnetic field.

Double-check commas between the parts of a sentence. A single comma should never break the flow of the main subject, verb, and object or complement of a sentence. Instead, commas should occur in pairs. Here are some examples (the bracketed commas indicate where commas are typically but mistakenly placed):

The discovery that moving a magnet within a coil could produce current[,] was a major breakthrough in the history of electronics.

(it's a long way from the subject "discovery" to the verb "was" but there should be no comma.)

Decreasing the radar operating frequency [,] increases the effective velocity coverage for the same sampling rate.

(The whole phrase "Decreasing the radar operating frequency" is the subject of the verb "increases.")

It can be assumed that [,] precipitation particles move with the air in their environment and are therefore good tracers for air motion.

Use a comma between all independent clauses. Whenever you have a compound sentence (those are the ones joined by ***and, but, or, nor, for, whereas****), put a comma before the conjunction (the words I just listed in italics). Length of the compound sentence does not matter. Examples (conjunctions are italicized):*

The water sampler is made of acrylic, *but* a plastic layer protects the outer surface.

By mid August, the money of the institute was gone, *and* now we have to survive on a limited budget.

Gamma rays produce few pairs, *but* they travel farther.

Type your name, and then press the Enter key.
(These are two imperative sentences--this qualifies as a compound sentence. But check out the next example.)

You should type your name and then press the Enter key.
(In this case "you" is the subject for the compound verb--it's the subject for both "should type" and "press." This is not a compound sentence, and therefore there is no comma before "and.")

Use commas around all nonrestrictive elements. Nonrestrictive elements are phrases and clauses that a sentence literally does not need to say what it wants to say. These elements can be taken out of the sentence without hurting its basic message. Use commas around these nonrestrictive elements. For example:

The Coriolis force, caused by the rotation of the earth, always acts at right angles to the pressure gradient in the northern hemisphere.

The formation of hurricane, a type of atmospheric vortex, involves the combined effect of pressure and circular wind.

Do not use comma around restrictive elements.

You can use the system *when* the login prompt appears.

A drop of water almost flattens out *when* it is placed on a glass plate.

Use a comma before the "and" in a series of three or more.

In humans, the period of rapid brain development begins at mid-pregnancy, peaks in the third trimester, *and* ends by the postnatal year.

Colons, Semicolons

The most important function of a colon is to act as a signal to the reader, it says something like "attention here it comes". For example:

Hurricane size is expressed in three ways: the strength of the maximum winds, the diameter of the hurricane-force winds, the diameter of the gale-force winds, and the overall size the cyclone circulation.

Don't use a colon inside a complete sentence. It should connect only complete sentences to complete sentences or complete sentences to lists.

Problem: Three significant types of generating plants are: hydroelectric, fossil-fuel- electric, and nuclear-electric.

Revision: Three significant types of generating plants are hydroelectric, fossil-fuel-electric, and nuclear-electric.

Semicolons. *The semicolon could be called a strong comma. Its two main uses are to connect two (or more) sentences that seem very closely related and to clarify the punctuation of a series of items that have their own internal commas.*

Gray mold is one of the most important fungal diseases in Italian viticulture; its growth causes serious production losses and adversely affects wine quality.

The other use of the semicolon worth noting here is how it can clarify items in a series that have commas within them already:

Injury caused by pollutants can easily be mistaken for injury caused by other stresses; or, just the opposite, injury symptoms from adverse temperature or moisture relations may resemble, and can be incorrectly attributed to, air pollutants.

Comma Splices and Runons

The comma-splice and run-on sentence are all examples of the problem in which two or more sentences are improperly joined. In the typical comma-splice sentence, two sentences are joined by a comma without an intervening coordinating conjunction (and, or, nor, but, yet). Technically, the run-on sentence is a sentence that goes on and needs to be broken up. A fused sentence is two complete sentence just jammed together without any punctuation and without any conjunction.

We write comma-splice and run-on sentences because we sense that the sentences involved are closely related--a full-stop period just doesn't seem right. Actually, the semicolon is the right choice in these situations. Here are some examples of this type of problem and their revisions:

Problem: Sometimes, books do not have the most complete information, it is a good idea then to look for articles in specialized periodicals.

Revision: Sometimes, books do not have the most complete information; it is a good idea then to look for articles in specialized periodicals.

Problem: Most of the hours I have earned toward my doctor's degree do not transfer, however, I do have at least some hours the Innsbruck University will accept.

Revision: Most of the hours I have earned toward my doctor's degree do not transfer. However, I do have at least some hours the Innsbruck University will accept.

Problem: This report presents the data we found concerning the cost of the water treatment project, then it presents comparative data from other similar projects.

Revision: This report first presents the data we found concerning the cost of the water treatment project and then comparative data from other similar projects.

Fragments

Fragments are simply grammatically incomplete sentences. They usually come about because the sentence may already seem too long.

Examples:

Problem: In a proposal, you must include a number of sections. For example, a discussion of your personnel and their qualifications, your expectations concerning the schedule of the project, and a cost breakdown.

Revision: In a proposal, you must include a number of sections: for example, a discussion of your personnel and their qualifications, your expectations concerning the schedule of the project, and a cost breakdown.

Problem: The research team has completely reorganized the workload. Making sure that members work in areas of their own expertise and that no member is assigned proportionately too much work.

Revision: The research team has completely reorganized the workload. They made sure that members work in areas of their own expertise and that no member is assigned proportionately too much work.

Subject-Verb Agreement

With subject-verb agreement problems, either a singular subject is matched with a plural verb, or vice versa. (Remember that some singular verbs end in -s.) Sometimes it's hard to spot the true subject, particularly in these cases:

When several words come between the subject and verb:

Problem: The communications between the programmer and the rest of the company tends to be rather informal.

Revision: The communications between the programmer and the rest of the company tend to be rather informal.

Problem: The purpose of the monorails have changed from one of carrying food to one of carrying people to work in crowded urban areas.

Revision: The purpose of the monorails has changed from one of carrying food to one of carrying people to work in crowded urban areas.

*When there are two or more subjects joined by **and** or **or**:* SUBJ : A and B are . . .

Problem: In the computer's memory is stored the program and the data to be manipulated by that program.

Revision: In the computer's memory are stored the program and the data to be manipulated by that program.

When the subject is a word like each, every, none, either, neither, no one, and nobody, especially when followed by a plural object of a preposition:

Problem: Each of the steps in the process are treated in a separate chapter of this report.

Revision: Each of the steps in the process is treated in a separate chapter of this report.

Problem: Neither of the two high-level languages offer a facility for designing your own variables.

Revision: Neither of the two high-level languages offers a facility for designing your own variables.

When the subject is a phrase or clause acting as a unit:

Problem: What is truly amazing about bits cells in integrated circuits are that 30 cells lined up side by side are about as wide as a human hair.

Revision: What is truly amazing about bits cells in integrated circuits is that 30 cells lined up side by side are about as wide as a human hair.

Pronoun Reference

A pronoun, as you may know, is a word like "he," "they," "him," "them," "which," "this," "everyone," "each," and so on. It's like a variable in programming--it points to some other word that holds its meaning. Problems arise when you can't figure out what the pronoun is pointing to (its "reference") and when it doesn't "agree" in number or gender with what it is pointing to.

Problem: Lasers have also been used to study the reaction by which nitric oxide and ozone make nitrogen dioxide (NO_2) and molecular oxygen. *It* plays an important role in the chemistry of the ozone layer that surrounds the earth and protects us from the sun's harmful ultraviolet radiation.

Revision: Lasers have also been used to study the reaction by which nitric oxide and ozone make nitrogen dioxide (NO_2) and molecular oxygen. *This process* plays an important role in the chemistry of the ozone layer that surrounds the earth and protects us from the sun's harmful ultraviolet radiation.

The second kind of pronoun-reference problem arises over lack of agreement between the pronoun and what it refers to. Here is one common example:

Problem: These days, every student needs to own their own computer.

Revision: These days, every student needs to own a computer.

Pronoun Case (Who, Whom)

***Who** is used in the same slots that words like he, she, they, and we are used; **whom** is used in the same slots that him, her, them, and us are used.*

Geographical uses of the

Do not use the before:

names of countries, except The Netherlands and the US (Italy, Mexico, Bolivia)
names of cities, towns, or states (Seoul, Manitoba, Miami)
names of streets (Washington Blvd., Main St.)
names of lakes and bays, except with a group of lakes like the Great Lakes (Lake Titicaca, Lake Erie)
names of mountains, except with ranges of mountains like the Andes or the Rockies
names of continents (Asia, Europe)
names of islands except with island chains like the Aleutians, the Hebrides, or the Canary Islands

Do use the before:

names of rivers, oceans and seas (the Nile, the Pacific, the Sea of Japan)
points on the globe (the Equator, the North Pole)
geographical areas (the Middle East, the West)
deserts, forests, gulfs, and peninsulas (the Sahara, the Persian Gulf, the Black Forest, the Iberian Peninsula)

Latin abbreviations most commonly used:

a.m. (*ante meridiem*): before noon
ca. (*circa*): around
cf. (*confer*): compare
e.g. (*exempli gratia*): for example
et al. (*et alii*): and others
etc. (*et cetera*): and so on
id. (*idem*): the same
i.e. (*id est*): that is
op. cit. (*opere citato*) in the work cited: refers the reader back to the author's previously cited work, but to a different page.
p.m. (*post meridiem*): afternoon
s.l. (*sine loco*): without place
vs. (*versus*): against

Numbers vs. Words

Rules:

1) Don't start sentences with numerals--write the number out or, better yet, rephrase the sentence so that it doesn't begin the sentence.

one, two, three, four, five . . .
2) Use numerals for values above 10. (1, 2, 3, 4, 5, 6, 7, 8, 9, 10 → letres) (11, 12, 13 . . .)

3) Use words for numerical values below 10, except when they indicate a precise value.

4) Don't make numerical values look more exact than they are. For example, don't add ".00" to a value if the amount is rounded or estimated.

5) For decimal values less than 1, add a 0 before the decimal point: for example, .08 should be 0.08.

Example:

"The baskets received full sunlight from *07:00* to 17:00 h. The seawater varied from *28 to 29* °C and 24 to 28 ‰ during the *2* wk study. Two baskets in each group were provided with red algae and two with green algae. Algae were provided *ad libitum* each day at dusk, and uneaten remnants were removed at dawn. Thus, there were *two* replicates of *six* sea hares, each subjected to either UV or no UV and fed either *18* red or 22 green algae."

Numbers, dates, map references

(a) In the text, numbers under 10 should be spelt out where used individually.

(b) Commas should be inserted with four or more figures; e.g. 6,789; 2,060.313

(c) Decimal points should be indicated by full stops, not commas. Zeros should be included; e.g. 0.12

(d) There should be no space between numbers and abbreviated units; e.g. 6m, 25kg

(e) Dates should be in the form: 17 March 1983 not February 20, 1998

(f) Map references should be in the form: 42°6'S, 23°42'W

SI base units

Base quantity	**Name**	**Symbol**
length	meter	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
temperature	kelvin	K
amount of substance	mole	mol
luminous intensity	candela	cd

Units outside the SI that are accepted for use with the SI

Name Symbol Value in SI units

minute (time) min 1 min = 60 s
hour h 1 h = 60 min = 3600 s
day d 1 d = 24 h = 86 400 s
degree (angle) ° 1° = (/180) rad
minute (angle) ´ 1 = (1/60)° = (/10 800) rad
second (angle) ´´ 1 = (1/60) = (/648 000) rad
liter L 1 L = 1 dm^3 = 10^{-3} m^3

Other units outside the SI that are currently accepted for use with the SI, subject to further review

Name Symbol Value in SI units
nautical mile   1 nautical mile = 1852 m
knot 1 nautical mile per hour = (1852/3600) m/s
hectare ha 1 ha = 1 hm^2 = 10^4 m^2
bar bar 1 bar = 0.1 MPa = 1000 hPa = 105 Pa
ångström Å 1 Å = 0.1 nm = 10-10 m
curie Ci 1 Ci = 3.7 x 1010 Bq
roentgen R 1 R = 2.58 x 10^{-4} C/kg

SI prefixes

Factor Name Symbol
10^{24} yotta Y
10^{21} zetta Z
10^{18} exa E
10^{15} peta P
10^{12} tera T
10^{9} giga G
10^{6} mega M
10^{3} kilo k
10^{2} hecto h
10^{1} deka da

10^{-1} deci d
10^{-2} centi c
10^{-3} milli m
10^{-6} micro μ
10^{-9} nano n
10^{-12} pico p
10^{-15} femto f
10^{-18} atto a
10^{-21} zepto z
10^{-24} yocto y

SI Unit rules and style conventions

General:
Only units of the SI and those units recognized for use with the SI are used to express the values of quantities. Abbreviations such as sec, cc, or mps are avoided and only standard unit symbols, prefix symbols, unit names, and prefix names are used.

proper:
s or second; cm3 or cubic centimeter; m/s or meter per second
improper:
sec; cc; mps

Plurals
Unit symbols are unaltered in the plural.
proper:
l = 75 cm
improper:
l = 75 cms

Punctuation
Unit symbols are not followed by a period unless at the end of a sentence.
proper:
the length of the bar is 75 cm.
The bar is 75 cm long.
improper:
The bar is 75 cm. long.

Multiplication & division
A space or half-high dot is used to signify the multiplication of units. A solidus (i.e., slash), horizontal line, or negative exponent is used to signify the division of units. The solidus must not be repeated on the same line unless parentheses are used.

Quan és $\frac{m}{s}$ és $m \cdot s^{-1}$

proper:
The speed of sound is about 344 $m \cdot s^{-1}$ (meters per second)
The decay rate of ^{113}Cs is about 21 ms^{-1} (reciprocal milliseconds)
improper:
The speed of sound is about 344 ms^{-1} (reciprocal milliseconds) $1/ms$
The decay rate of ^{113}Cs is about 21 $m \cdot s^{-1}$ (meters per second)

Math notation
It is clear to which unit symbol a numerical value belongs and which mathematical operation applies to the value of a quantity.
proper:
35 cm x 48 cm
20 °C to 30 °C or (20 to 30) °C
improper:
35 x 48 cm
20 °C-30 °C or 20 to 30 °C

Use of *a* and *an*

A goes before all words that begin with consonants.

a Petri dish
a microscope
a sediment core

with one exception: Use an before unsounded h:

an honest error

An goes before all words that begin with vowels:

an image analysis
an echosound
an indicator

with one exception: When u makes the same sound as the y in you (or eu), then a is used:

a union
a united front
a eutrophic lake

Apostrophes

It is used primarily to show possession and, minimally, to show plurals. The rules are simple:

1) *To show possession for singular words not ending in s, add 's:*

Earth's shadow the fish's scale
the Moon's orbit Tyrol's population

2) *To show possession for singular words ending in s, add 's (usage varies on this, but this is a safe choice):*

Mars's (or Mars') shadow Venus's (Venus') orbit

3) *To show possession for plural words ending in s, add ' to the plural form of the word (but don't add another s):*

planets' orbits these computers' capabilities
these species' niches these countries' population

Rules for its and it's. Its is the possessive form of it; it's is the contraction for it is.

The HPLC pump is missing one of its adjusting knobs. (Possessive)

It's unfortunate that your manuscript has so many errors (Contraction for "it is")

AUTHORSHIP

Authorships should include ***only*** those who actively contributed to the overall design and execution of the experiments. Authors should be listed ***in order of importance*** to the experiments with the most important being the first or senior author, followed in order by the next most significant contributors to the project. The sequencing of authors on a published paper should be decided, unanimously, ***before*** the research is started. In many cases, the corresponding author is not the first in the authorship. In this case, it should be identified (in most cases the senior author is also the corresponding one, but there are also exceptions).

Principles of authorship policy
The following principles of authorship have been derived from editorial publications from leading journals and are in accord with the rules of the International Committee of Medical Journal Editors.

a. Individual authorship

In order to qualify for authorship an individual must fulfill the following criteria:

i. Each author should have participated sufficiently in the work represented by the article to take public responsibility for the content.

ii. Participation must include *three* steps:

conception or design of the work represented by the article OR analysis and interpretation of the data OR both;
drafting the article or revising it for critically important content; and
final approval of the version to be published.

Participation solely in the collection of data is insufficient by itself and those persons who have contributed intellectually to the article but whose contributions do not justify authorship may be acknowledged and their contribution described. The sequence of authors should reflect the relative contribution of authors to the intellectually most critical aspects of the work.

b. Group authorship

Group authorship may be appropriate for some publications. This should be considered when the intellectual work behind a publication has been carried out by a group, and no one person can be identified as having substantially greater responsibility for its contents than the others. In such cases, the authorship will be represented by the collective title and the article should carry a footnote of the names of the people (and their institutions) represented by the corporate title.

c. Determining authorship

Tentative decisions on authorship should be made as soon as possible. At the same time, the authors should decide who will have responsibility for subsequent decisions on authorship and that this person should be the one who had most responsibility for the conception of the work.

Further reading: Huth EJ (1986). Guidelines on authorship of medical papers. Annals of Internal Medicine, 104: 269-274.

HOW LONG SHOULD A MANUSCRIPT BE?

SECTION	LENGTH OR NUMBER
Introduction	1-2 pages
Materials & Methods	1-3 pages
Results	2-4 pages
Discussion	3-5 pages
References	(perhaps 30)
Tables	(perhaps 1-5)
Figures	(perhaps 1-5)

TITLE

The title of the paper is the most often encountered part of any paper and therefore has great importance in the success of the paper. Thousands of readers will scan the title **but never** read the abstract or paper itself.

Abstracting and Indexing services will also utilize the title, therefore, all words in the title should be chosen with great care and their association with other words in the title carefully managed.

What is a good title?

The fewest possible words that adequately describe the contents of the paper.

How long should the title be?

Most titles are unnecessarily too long. Many journals now limit title submissions to 10 to 12 words. Consequently, it becomes necessary to employ effective syntax (word order) and avoid waste words such as "Investigations on" and "Observations on" in titles.

The title should be a label and not a sentence. Consequently it does not suffer from the need to be complete and balanced, i.e., subject, verb, object arrangement, etc.

Titles should never contain abbreviations and jargon. Indexing these word substitutions makes indexing difficult to impossible and impairs the titles credibility. Exceptions: abbreviations like DNA, RNA, ATP

Hanging or subtitles should also be avoided, i.e., "The biology of amphibia: IV. Skin respiratory interface".

Examples:

1) Action of antibiotics on Bacteria

2) Action of Polyene Antibiotics on Plant-Pathogenic Bacteria

3) Action of Streptomycin on *Mycobacterium tuberculosis*

4) Inhibition of growth of *Mycobacterium tuberculosis* by streptomycin

Some examples of bad titles:

"Aquatic Oligochaeta in some tributaries of the River Rhine." (Hydrobiologia 1987).

"Some new or interesting euglenoids from Deutschland." (Cryptogamie Algol. 1989).

"New species, new classification and new citations of ostracods from Mexico". (Neotropica 1980).

"An operative problem in genetic evaluations with non-automatized computers (Physis, 1977).

Table 1. Words that must be avoided in a title and some possible combinations:

1	2	3	4	5
Some	interesting	aspects	to the	knowledge
	considerations		with respect to	
New	preliminary/ies	data	referred to	
		studies	relative to	
First		investigation/s	about	
		note/s		
		observations		
		contribution/s		

How to prepare a good title

1) Define the title after you have finished to write the manuscript.
2) Don't imitate. Remember that your work is unique.
3) Save words and be precise (honest).
4) Take care of the syntax. It is not the same "the concentration of lethal oxygen" and "the lethal concentration of oxygen".
5) Avoid the words mentioned in table 1.

Abstract

ABSTRACT

The abstract is a kind of miniversion of the paper. The abstract should provide a *brief* summary of each of the main sections of the paper.

The structure will include:

1) the principle objectives and scope of the investigation
2) a general description of the metodology or experimental design employed
3) a summary of the results
4) the main conclusions

The abstract should never give any information or conclusion that is not stated in the paper. References to the literature must not be cited in the abstract (except when your paper deal with a modification of a previously published method). No cites.

Passive voice pattern

The passive voice is not ordinarily considered a "pattern," but it is an important and often controversial construction. It reverses the subject and object and, in some cases, deletes the subject.

Compare these example active and passive voice sentences:

Passive voice	**Active voice**
Saccharin is now permitted as an additive in food.	The FDA now permits saccharin as an additive in food.
This report is divided into three main sections.	**I have divided this report into** three main sections.
Windmills are classified as either lift or drag types.	Scientists classify windmills as either lift or drag types.

The introduction

An introduction is usually 5% to 10% of the length of the paper, and can comprise several paragraphs. Your reader gains his or her first impression of your paper from this section so a good introduction is vital. It is useful to first include some **brief** background information to provide a focus for your topic; however do not pad your introduction with extraneous material. The introduction should focus a reader's attention on the central theme of an essay. It should clarify how you intend to interpret or limit the question and give a clear, but brief overview of the issues to be covered and the order in which they will be covered. You may also need to define key terms in the question.

Your introduction should tell your reader:

1) How you understand the topic
2) The main thrust of your argument
3) What issues you will cover (and in which order)
4) Some indication of your conclusion.

Remember:
Writing an essay is not like writing a **mystery story**! Your reader should not have to read several pages before finding out your argument about the thesis presented in the question. The introduction should be directly related to the question.

Paragraphing

Paragraphing

A well-constructed paragraph consists of a topic sentence, supporting sentences and a concluding sentence. A good ***topic sentence*** states both the topic and the central idea of the paragraph. It is neither too general nor too specific; it states the main idea clearly, but does not give the specific details. The topic sentence is usually, but not always, the first sentence in the paragraph. ***Supporting sentences*** elaborate the topic sentence by giving supporting details, examples, facts, statistics and quotations. Every sentence must be clearly related to the main idea and it is essential that these other sentences really **do** support your main point. It usually takes several sentences to make and substantiate a main point. A ***concluding sentence*** summarizes the important points briefly and signals the end of the paragraph.

How long should a paragraph be?

The paragraph is a *unit of ideas, not a unit of length.* The relative length of a paragraph is determined by the complexity and importance of the paragraph's main point. In addition, not all topic sentences have equal need for development. Varying the length of your paragraphs adds interest to your writing. However, a series of short paragraphs may give the impression that you have not adequately developed or substantiated the topic. Short paragraphs are best used to announce a change of subject or approach, or to explain how the following part of the essay is organized.

Paragraph linkage

Paragraphs dealing with separate aspects of a main topic should be connected so that they do not look like completely independent pieces of writing. Each should be linked with the paragraph before and after, so that there is a clearly defined *line of argument* running through the entire piece of writing. It should also be clear to your reader how each point relates to the topic or question you are answering.

+

Academic words for reporting and connecting ideas

A part of good academic writing style is the ability to present your reader with the steps of an argument that are logical and cohesive (connected). While this largely depends on the content of your argument, the use of *connectives* can reinforce the direction those steps are taking. Moreover, using the words on this list will make you think more about the ideas you are reporting or presenting, as well as providing some variety in your writing.

Some useful sentence openers:

TO ADD AN IDEA	In addition, Another reason/aspect/example Furthermore, Moreover,
TO INTRODUCE A CONTRAST	Compare this with In contrast, However, In spite of Although
TO GIVE AN EXAMPLE	For example, An example of this is
TO POINT TO EVIDENCE	It can be seen that In support of this
TO MAKE A TENTATIVE STATEMENT	Studies suggest that It would seem that
TO INTRODUCE A RESULT	Accordingly, As a consequence,
TO INTRODUCE A RESULT	As a result,
TO INTRODUCE A LOGICAL	Thus

CONCLUSION	Therefore, It could be concluded that
TO CONCLUDE	In conclusion,

CATEGORY	**CONNECTIVES**
ADDITION	and also similarly
OPPOSITION	but alternatively on the other hand nevertheless
REASON	because
CONFIRMATION	in fact indeed
SEQUENCE	subsequently then next
PARTICULARISATION	in particular specifically

A Dictionary of Useful Research Phrases

Research Phrase	Translation
It has long been known...	*I didn't look up the original reference.*
A definite trend is evident...	*These data are are practically meaningless.*
Of great theoretical and practical importance...	*Interesting to me.*
While it has not been possible to provide definite answers to these questions...	*An unsuccessful experiment, but I still hope to get it published.*
Three of the samples were chosen for detailed study...	*The results of the others didn't make any sense.*
Typical results are shown...	*The best results are shown.*
These results will be shown in a subsequent report...	*I might get around to this sometime if I'm pushed.*
The most reliable results are those obtained by Jones...	*He was my graduate assistant.*
It is believed that...	*I think.*
It is generally believed that...	*A couple of other people think so too.*
It is clear that much additional work will be required before a complete understanding of the phenomenon occurs...	*I don't understand it.*
Correct within an order of magnitude...	*Wrong.*
It is hoped that this study will stimulate further investigation in this field...	*This is a miserable paper, but so are all the others on this topic.*
Thanks to X for assistance with the experiment and to Y for valuable discussions...	*X did the work and Y explained to me what it meant.*
A careful analysis of obtainable data...	*Three pages of notes were obliterated when I knocked over a glass of beer.*

Material and Methods

This section must answer all of the basic questions about the way the study was conducted: where, when and how.

Where: In the case of field studies, give the exact location. Describe relevant features of the study site such as vegetation, climate, topography, and human disturbance. In the case of laboratory studies, give the location and identify the general facilities available to the research. In either case, explain why this was an appropriate site for the research.

When: Give the time periods during which work was done (year, month, day, time of day) whenever this is relevant to the type of data collected. Describe also special conditions of weather or other factors that prevailed during the study period.

How: Explain the techniques of collecting data or of conducting experiments, and describe the equipment used. Where these procedures and equipment are standard, do this by reference to published descriptions. Otherwise, describe them in enough detail that a reader can duplicate them. Indicate how samples were obtained in an honest and accurate fashion. For example, do not describe sampling as "random" unless some specific technique for obtaining randomness was employed. State the techniques used to record, summarize, and analyze the data. →When specific statistical tests are utilized, cite a published source for them.

Results

1) Be sure that you have understood the meaning of each result.
2) Decide where is necessary to present tables OR figures.
3) Start out with the most general ideas and relationships, example:

"Concentration of phytoplankton had a significant effect on zooplankton fecundity (ANOVA $p=0.01$; Table 1)."

4) Having described the basic relationship, you can enlarge upon the nature of the relationship, example:

"An exponential increase in egg production of *Cyclops abyssorum tatricus* was found for algal concentrations between 10 and 10,000 cells per ml $r^2=0.779$, $p=0.05$; Fig. 1)."

5) When describing relationships within data sets, be careful not to use sentences like: The ANOVA showed that.." etc. Statistical tests don't show anything.
6) Also, avoid allowing this section to turn into a long list of results with no interpretation. "Sunlight significantly affected reproduction in *C. abyssorum* (Table 1).
7) Finally, this section must be FREE of interpretations of the data.

TYPE OF FIGURES

Bar Graphs:

Use bars for **discrete** categories
Avoid 3-dimension bars
Keep bars same width
Keep scales simple
Make bars visually distinct
Start vertical axis at zero
Break axis if scales are long
Avoid placing Bar Graphs with different axes side by side

Line Graphs:

Use Line Graphs for **continuous** data
Show key points along horizontal axis
Limit the number of lines
Make the lines distinct
Label lines carefully
Use proportionate axes

Pie Charts:

Labeled each slice of the pie chart
Place the number or percentage under the corresponding label
Avoid clutter by having no more than six slices within a pie
Consider combining smaller groups to reduce the slices to six

Orientation Maps

When preparing Orientation Maps, consider the following

Provide a general orientation map of the area
Provide a second map that details the specific area
Simplify the map, i.e. show only key features
Orient map with North at the top of the page
Provide a distance scale
Add legend with symbols, if needed

General:

Place Figures on separate pages at the end of the document
Write complete descriptive titles
Use Arabic numbers for Figures

Some common questions:

Should figures replace text?
How many figures should I use?
Where should figures appear in the text?
What should figures look like?
How large should figures be?

Discussion

In this section, the author must interpret the data in relation to the original objectives or hypotheses, and relate these interpretations to the present state of knowledge and future needs for research. Care must be taken that this section is genuinely interpretative, and is not just a rehash of results at some higher level of generality.

The author should attempt to do several of the following things in a good discussion section:

1) Reach conclusions about the initial hypotheses.
2) Compare conclusion to those of others.
3) Identify errors and basic inadequacies of the techniques used.
4) Speculate upon broader meaning of the conclusions reached.
5) Identify needed next steps in research on the problem.

THE APPROPRIATE TENSE

Suppose that your research concerned the effect of streptomycin on *Streptomyces everycolor*. The tense in the different parts of the manuscript would vary somewhat as follow:

Abstract
The effect of streptomycin on *S. everycolor* grown in various media WAS tested. Growth of S. everycolor, measured in terms of optical density, WAS inhibited in all media tested. Inhibition WAS most pronounced at high pH levels.

Introduction
Streptomycin IS an antibiotic produced by *Streptomyces griseus* (citation). This antibiotic INHIBITS the growth of certain strains of *Streptomyces* (citations). The effect of streptomycin on *S. everycolor* IS reported in this paper.
Material and Methods
The effect of streptomycin WAS tested against *S. everycolor* grown on Trypticase soy agar (BBL). Various growth temperatures and pH levels WERE employed. Growth WAS measured in terms of optical density.

TEMPS VERBAL → Present → published work
Past → my results

Results
Growth of *S. everycolor* WAS inhibited by streptomycin at all concentrations tested (Table 1) and at all pH levels (Table 2). Maximum inhibition OCCURRED at pH 8.2; inhibition WAS slight below pH 7.

Discussion
S. everycolor WAS most susceptible to streptomycin at pH 8.2, whereas *S. nocolor* IS most susceptible at pH 7.6 (Citation). Various other *Streptomyces* species ARE most susceptible to streptomycin at even lower pH levels (Citations).

RULE
Use the present tense when you refer to previously published work, and use the past tense when referring to your present results.

EXCEPTIONS

1) In the area of attribution and presentation it is correct to say Niemand (1997) SHOWED that streptomycin inhibits *S. nocolor* or Table 4 SHOWS that streptomycin inhibited *S. everycolor* at all pH levels.

2) The results of calculations and statistical analyses should be in the present tense, even though statements about the objects to which they refer are in the past tense.

An example of plagiarism

Smith (1981) suggests that this discrepancy in feeding rates may reflect differences in light levels used in the two different experiments. Jones (1984), however, found that light level did not influence the feeding rates of these animals and suggested that the rate differences reflect differences in the density at which the animals were held during the two experiments.

The discrepancy in feeding rates may reflect differences in light levels. Jones (1984), however, found that light level did not influence feeding rates. Perhaps the difference in rates reflects differences in the density at which the animals were held during the two experiments.

Word Usage In Scientific Writing

This listing includes some of the troublesome words, terms, and expressions most frequently found in manuscripts:

Above ("the above method," "mentioned above," etc.) -- Often, you are referring to something preceding, but not necessarily above; a loose reference, convenient for writers, but not for readers. Be specific. You know exactly what and where, but your readers may have to search (sometimes through much preceding material).
Affect, effect -- Affect is a verb and means to influence. Effect, as a verb, means to bring about; as a noun, effect means result.
All of, both of -- Just "all" or "both" will serve in most instances.
Alternate, alternative -- Be sure which you mean.
Apparently (apparent) -- means obviously, clearly, plainly evident, but also means seemingly or ostensibly, as well as observably. You know the meaning that you intend, but readers may not. Ambiguity results. Use obvious(ly), clear(ly), seeming(ly), evident(ly), observable or observably, etc., as needed to remove doubt.
At the present time, at this point in time -- Say "at present" or "now" if necessary at all.
But (to begin a sentence) -- Use "However".
By means of -- Most often, just "by" will serve and save words.
Compare with, compare to -- *Compare with* means to examine differences and similarities; *compare to* means to represent as similar. For example: one may conclude that the music of Brahms compares to that of Beethoven, but to do that, one must first compare the music of Brahms with that of Beethoven.
Comprise -- comprise meant to contain, include, or encompass (not to constitute or compose), despite two now opposite meanings. Avoid.
Correlated with, correlated to -- Although things may be related to one another, things are correlated with one another.
Different from, different than – Use different from! One thing differs from another, although you may differ with your colleagues.
During the course of, in the course of -- Just use "during" or "in."
Either....or, neither...nor -- Apply to no more than two items or categories. Similarly, former and latter refer

Experience(d) -- To experience something is sensory; inanimate, unsensing things (lakes, soils, enzymes, streambeds, farm fields, etc.) do not experience anything.

High(er), low(er) -- Much too often used, frequently ambiguously or imprecisely, for other words such as greater, lesser, larger, smaller, more, fewer; e.g., "Occurrences of higher concentrations were lower at higher levels of effluent outflow." One interpretation is that greater concentrations were fewer or less frequent as effluent volume(s) increased, but others also are possible.

However -- Place it more often within a sentence or major element rather than at the beginning or end.

In order to -- For brevity, just use "to".

It should be mentioned, noted, pointed out, emphasized, etc. -- Such preambles often add nothing but words. Just go ahead and say what is to be said.

Less(er), few(er) -- "Less" refers to quantity; "fewer" to numbers.

Percent, percentage -- Not the same; use percent only with a number.

Predominate, predominant -- Predominate is a verb. Predominant is the adjective; as an adverb, predominantly (not "predominately").

Prior to, previous to -- Use "before", or "preceding". There are prior and subsequent events that occur before or after something else, but prior to is the same kind of atrocious use that attempts to substitute "subsequent to" for "after."

Since -- Has a time connotation; use "because" or "inasmuch as" when either is the intended meaning.

Small in size, rectangular in shape, blue in color, tenuous in nature, etc. -- Redundant.

That and which -- Two words that can help, when needed, to make intended meanings and relationships clear. Example: "Alkaloids (that, which) contain nitrogen can be poisonous", but careful! These two sentences have different meanings depending of the use of that or which.

Solution: write the sentence twice, one with commas and one without

"Alkaloids, which contain nitrogen, can be poisonous"

"Alkaloids which contain nitrogen can be poisonous"

If the material between commas can be omitted without destroying the sentence, use which and enclose the clause within commas; otherwise, remove the commas and use "that" (a restriction).

To be -- Frequently unnecessary. "The differences were [found] [to be] significant."

Varying -- Be careful to distinguish from various or differing. In saying that you used varying amounts or varying conditions, you are implying individually changing amounts or conditions rather than a selection of various or different ones.

Which is, that were, who are, etc. -- Often not needed. For example, "the data that were related to age were analyzed first" means that the data related to age were analyzed first. Similarly, for "the site, which is located near Innsbruck," try "the site, located near Innsbruck " or "the site, near Innsbruck." Rather than "all persons who were present voted," just say that "all persons present voted." Rephrasing sometimes can help. Instead of "a survey, which was conducted in 1974" or "a survey conducted in 1974," try "a 1974 survey."

Citations

Citations serve many purposes in a scientific paper:

1) Place a publication within its scientific context, relating it to the present state of scientific knowledge
2) They acknowledge the work of other scientists
3) Direct the reader toward additional sources of information
4) Acknowledge conflicts with other results
5) Provide support for the views expressed in a paper

Citations are the reward system of science and are connected in many cases to funding decisions and to the future of your career

The 1994 CBE (*Council of Biology Editors*) manual, Scientific Style and Format, describes two systems of documentation, *the citation-sequence* system and the *name-year* system. Both systems, often with variations, are used in scientific publications.

THE CITATION-SEQUENCE SYSTEM

Text Citations

Superscript numbers (or in one common variation, numbers in square brackets) in the text refer to references listed at the end of the document. The first reference cited in the text is 1, the second 2, and so on.

Multiple References

Ethical Obligations of Reviewers of Manuscripts

1. Inasmuch as the reviewing of manuscripts is an essential step in the publication process, and therefore in the operation of the scientific method, every scientist has an obligation to do a fair share of reviewing.

2. A chosen reviewer who feels inadequately qualified to judge the research reported in a manuscript should return it promptly to the editor.

3. A reviewer (or referee) of a manuscript should judge objectively the quality of the manuscript, of its experimental and theoretical work, of its interpretations and its exposition, with due regard to the maintenance of high scientific and literary standards. A reviewer should respect the intellectual independence of the authors.

4. A reviewer should be sensitive to the appearance of a conflict of interest when the manuscript under review is closely related to the reviewer's work in progress or published. If in doubt, the reviewer should return the manuscript promptly without review, advising the editor of the conflict of interest or bias. Alternatively, the reviewer may wish to furnish a signed review stating the reviewer's interest in the work, with the understanding that it may, at the editor's discretion, be sent to the author.

5. A reviewer should not evaluate a manuscript authored or co-authored by a person with whom the reviewer has a personal or professional connection if the relationship would bias judgment of the manuscript.

6. A reviewer should treat a manuscript sent for review as a confidential document. It should neither be shown to nor discussed with others except, in special cases, to persons from whom specific advice may be sought; in that event, the identities of those consulted should be disclosed to the editor.

7. Reviewers should explain and support their judgments adequately so that editors and authors may understand the basis of their comments. Any statement that an observation, derivation, or argument had been previously reported should be accompanied by the relevant citation. Unsupported assertions by reviewers (or by authors in refutation) are of little value and should be avoided.

8. A reviewer should be alert to failure of authors to cite relevant work by other scientists, bearing in mind that complaints that the reviewer's own research was insufficiently cited may seem self-serving. A reviewer should call to the editor's attention any substantial similarity between the manuscript under consideration and any published paper or any manuscript submitted concurrently to another journal.

9. A reviewer should act promptly, submitting a report in a timely manner. Should a reviewer receive a manuscript at a time when circumstances preclude prompt attention to it, the unreviewed manuscript should be returned immediately to the editor. Alternatively, the reviewer might notify the editor of probable delays and propose a revised review date. .

10. Reviewers should not use or disclose unpublished information, arguments, or interpretations contained in a manuscript under consideration, except with the consent of the author. If this information indicates that some of the reviewer's work is unlikely to be profitable, however, the reviewer could ethically discontinue the work. In some cases, it may be appropriate for the reviewer to write the author, with copy to the editor, about the reviewer's research and plans in that area.

Reviewing a manuscript

GENERAL:

1.importance and interest to this area of science
2.scientific soundness
3.originality
4.organization and clarity
5.cohesiveness of argument
6.degree to which conclusions are supported by the data
7.length relative to the number of new ideas and information
8.conciseness and writing style

SPECIFIC:
Support your general comments with specific evidence.

1. **Presentation** - Does the paper tell a cohesive story? Is it a tightly reasoned argument evident throughout the paper? Where does the paper wander from this argument? Do the title, abstract, key words, introduction and conclusions accurately and consistently reflect the major point(s) of the paper? Is the writing concise, easy to follow, interesting?
2. **Length** - What portions of the paper should be expanded? condensed? combined? deleted? (PLEASE don't advise an overall shortening by X %. Be specific!)
3. **Methods** - Are they appropriate? current? described clearly enough so that the work could be repeated by someone else?
4. **Data presentation** - When results are stated in the text of the paper, can you easily verify them by examining tables and figures? Are any of the results counter-intuitive? Are all tables and figure clearly labeled? well planned? too complex? necessary?
5. **Statistical design and analyses** - Are they appropriate and correct? Can the reader readily discern which measurements or observations are independent of which other measurements or observations? Are replicates correctly identified? Are significance statements justified?
6. **Errors** - Point out any errors in technique, fact, calculation, interpretation, or style.
7. **Citations** - Are all (and only) pertinent references cited? Are they provide for all assertions of fact not supported by the article itself?
8. **Overlap** - Does this paper report data or conclusions already published or in press? If so, please provide details.

FAIRNESS and OBJECTIVITY -- If the research reported in this paper is flawed, *criticize the science*, not the scientist. Harsh words in a review will cause the reader to doubt your objectivity; as a result, your criticism will be rejected, even if they are correct!

Comments directed to the author should convince the author that:

1. you have read the entire paper carefully
2. your criticisms are objective and correct, are not merely differences of opinion, and are intended to help the author improve his or her paper, and
3. you are qualified to provide an expert opinion about the research reported in this paper

If you fail to win the author's respect and appreciation, your efforts will have been wasted.

ANONYMITY -- You may sign your review if you wish. If you choose to remain anonymous, avoid comments to the authors that might serve as clues to your identity, and do not use paper that bears the watermark of your institution.

Please submit your review in four parts:

1. The rating form
2. Comments for the author (DO NOT include your recommendation to accept or reject the paper)
3. The manuscript (with or without comments written on it)
4. A cover letter to the editor, providing a brief, candid summary of your opinion of the paper.

EXAMPLE

Comments for the authors

MS #99 "COMPLETE NAME" submitted to Journal of Irreproducible Research by Somebody et al.

General comments:

This manuscript presents results from a series of measurements of the microbial food web structure and activity in solar salterns ponds. The manuscript is nicely written and the results well documented. The main message is that the factors controlling bacterial abundance and heterotrophic production are different from "normal ecosystems" in those ponds with salinity >100‰, but are the same for those with salinity <100‰. After a comparison with other marine systems, the authors conclude that bacterivory is the main factor determining bacterial biomass in "normal" planktonic systems.

The paper has certainly interesting information worth to be published, however, the conclusions concerning the prokaryotic heterotrophic production (PHP) are not entirely convincing. The authors have used factors reported factors, however, have been estimated for very different kind of ecosystems and other type of microorganisms. Therefore, important questions that warrant more detailed analysis and new experiments are: how different are the conversion factors for heterotrophic bacteria and archaea from those reported in the literature? How to be sure that the PHP in saltern ponds of different salinity follows the same trend than in other ecosystems, if the conversion factors are different?

Specific comments:

1) P. 3, lin3 22: Was saturation regularly checked for concentrations of leucine and TdR?
2) p. 3., line 4:How were the pools of DNA and proteins extracted?
3) p.9, 1st par.: Were time series experiments also done to determine the complete inhibition of leucine incorporation in 45 min?
4) If the symbols in Fig.2 C are correct, the values for phosphate do not oscillate, but increase continuously until a salinity of 250‰ and then remains constant.
5) If the authors decided to have separate Results and Discussion sections, they should refrain to include Discussion into Results (see p. 11, 12, 13, 15).
6) p. 12, line 8: "The communities": the reference to what kinds of birds are found is not important within the context of the microbial communities.
7) p.13. The abundance of HNF is missing in fig. 4a.
8) Fig. 5. The error bars for the measurements of primary and secondary production should be introduced

End of the review

Final Tips On Writing Scientific Papers

1) Know your audience and write for that specific audience (Instructions for Authors)
2) Do not turn in a first draft: *Good writing is rewriting*
3) Avoid passive constructions wherever possible: Use of "I" and "We" but not in a repetitive way.
4) Avoid abusing word forms or verbs and adjectives as nouns (Nominalizations)

    Compare: "The low rate of encounters was a reflection of the reduction in population density" with the more direct "The low rate of encounters reflects a reduced population density"

5) Avoid awkward phrases where nouns and verbs are used as adjectives or adverbs (see examples)
6) Do not mix American and British English in the text: meters and centimetres or organize and organise
7) Use an outline to organize your ideas and writing
8) Think about the structure of a paragraph: A paragraph should begin with a topic sentence that sets the stage clearly for what will follow
9) Pay attention to tenses in each part of the manuscript
10) Captions shouldn't merely name a table or figure, they should explain how to read it
11) Show it don't tell it: the abuse of interesting and important

    Compare: "The large difference in mean size between population C and population D is particularly interesting" with "While the mean size generally varies among populations by only a few centimeters, the mean size in population C and D differed by 25 cm. Two hypotheses could account for this..."

12) Write about your results, not your tables, figures and statistics: Table 1 show this results, Figure 1 show that results

    Compare: "Figure 1 shows the relationship between the numbers of the bacterial species A and species B" with "The abundances of bacterial species A and B were inversely related (Figure 4)"

13) Focus your writing on ecological hypotheses, not statistical hypotheses.

    Ecological hypothesis underlying your research: "We tested the hypothesis that species A is influenced by the process X resulting in different growth rates in habitats S and T"

    Statistical null hypothesis: "There is no difference in growth rates among populations of species A in habitats S and T"

14) Develop a strategy for your discussion. Do not start with a statement about problems with methods or the items in your results about you feel most insecure. Start with what you can say clearly based on what you did, not what you can't say or what you didn't do.
15) *Quotations in the text*

Do not use extensive quotations in scientific writing. Usually, the only reasons for using the exact words of another author are 1) because it is this exact wording that is the focus of discussion, or 2) because the wording carries the intended meaning in so striking a fashion that it cannot easily be paraphrased. REMEMBER also that using the exact wording of other authors, in length greater than phrases, is PLAGIARISM, and is a violation of copyright law. The same applies for text written in English that is used in another language.

16) Take editorial comments seriously

Aspects to be considered in writing a scientific project
(from the European Science Foundation)

- ✓ Informative title
- ✓ Concise abstract
- ✓ Logical and attainable objective consistent with stated hypothesis/es
- ✓ Clear rationale and probable outcome
- ✓ Detailed study design
    - o Hypothesis/es and objectives
    - o Methodology in detail
    - o Statistics to be used
    - o Main outcome expected
    - o Time schedule and work development
    - o References
- ✓ Detailed funding request
- ✓ Personnel
- ✓ Equipment
- ✓ Consumables

Assessment criteria for evaluating projects

- ✓ Past progress from the applicant and the group
- ✓ Scientific quality of the project
- ✓ Originality
- ✓ Experimental design and approach
- ✓ Cost-effectiveness