for the reader. The phrase is worse than merely illiterate: it is rude.

This piling-up before a noun of words that are not adjectives, but are used adjectivally, is rather a new fashion in English scientific writing. It was seldom seen in Britain a quarter of a century ago. There can be scarcely any doubt about its origin. That many American scientists are of German descent is obvious when one looks at lists of authors in journals published in the United States. The process of piling up adjectival phrases is familiar to everyone who knows the German language. It does not make for clarity. It comes naturally to a German to write "die einzigen, durch unmittelbare Beobachtung sicher zu ermittelnden Stellen" or "das von dem Objectiv-system in der der Lichtquelle zugeordneten Ebene entworfene Beugungsspectrum." Unnecessarily difficult though this construction may seem to an Englishman, yet the German language does at least help us, through the inflection of the words, to follow our path through such passages as these. But when this kind of construction is forced artificially on our much less inflected tongue, and the prepositions are omitted, all pretence of clarity is lost.

The German-American style did not originate with men who had set themselves the high ideal of improving our language as a vehicle for scientific ideas. It was, on the contrary, the product of childhood, introduced by people whose parents had spoken in sentences constructed in their native, German way. It is strange indeed that an Englishman or Scot, accustomed since infancy to a simple syntax, with logical order of words, should copy a German-American imitation of English just because he happens to be writing in a scientific journal. Our own language, as written by those who know and love it, can scarcely be surpassed for clarity, directness, and simplicity.

It is noticeable that scientific books published in the United States are often written in a style that is close to ordinary English (though the American people have their own special words, spellings, and phrases). The difference in style between American books on one hand and papers on the other suggests that the publishers correct the style of writing where necessary while the editors of journals do not. It must be remarked that the German influence is altogether lacking from some American scientific papers which are models of lucidity and good style. A paper by Michaelis (*1*) on the reaction of dyes with nucleic acids may be quoted as a particularly fine example.

How can the standard of English in scientific journals be improved? One thinks at once of the obvious works of reference—of Fowler (*2*), Partridge (*3*), and Gowers (*4*). Quiller-Couch's lecture "On jargon" (*5*) is packed with good advice and horrid examples. The teachers of English in our schools could help very much, if they were to study the errors made in scientific papers and base their instruction to science students on their findings. Style, however, is largely dependent on example. Good reading makes good writing. One could almost imagine that some of the contributors to our scientific journals had never read anything but German-American. Yet good examples abound, in books of widely different scope. A trio so diverse as Macaulay, P. G. Wodehouse, and Sir Winston Churchill have this in common, that their English is lucid. There is no dearth of good examples to suit every taste.

A strange fact that gives some basis for optimism is this. When an author has finished the scientific part of his paper, he often addresses a note of general information to the reader. At this point he suddenly discloses for the first time that he can write English, for his ideas are clearly expressed. If one wished to translate what he now says into the style adopted in the rest of the paper, one would have to write something like this: "Some related interest possessing observations by the present writer *et al.* will be the subject of *ca.* $10^{0.3010}$ discrete communications" (*6*). The fact that he does not write like that shows that he need not have done so in the body of the paper.

One last, necessary word. The best English writers occasionally use some of the strange constructions mentioned in this article, often to produce a special effect for a particular occasion. They do so, however, only at long intervals. The greater part of their writing is so smooth and fluent that the reader forgets that he is reading and knows only that he is absorbing ideas.

References and Notes

1. L. Michaelis, *Cold Spring Harb. Symp. Quant. Biol.* 12, 131 (1947).
2. H. W. Fowler, *A Dictionary of Modern English Usage* (Clarendon, Oxford, 1937).
3. E. Partridge, *Usage and Abusage: a Guide to Good English* (Hamilton, London, 1948).
4. E. Gowers, *ABC of Plain Words* (H. M. Stationery Office, London, 1951).
5. A. Quiller-Couch, *On the Art of Writing* (Cambridge Univ. Press, 1925).
6. With the exception of the passage in quotation marks in this paragraph, all the examples given in this article are genuine: none was invented by myself or modified to suit my purpose. I am indebted to A. C. Hardy for a careful criticism of the first draft of this article.

Suggestions for Contributors to *Science*

To assure publication of papers with a minimum of delay and to provide readers with subject matter of a wide range and general interest, the AAAS editorial board has established the following policies.

Papers submitted by members and nonmembers of the AAAS will receive equal consideration for publication. Material that is not considered suitable for publication by the editorial board will be returned to the author, and it cannot be the subject of continuing correspondence.

Types of Articles

1) *Lead articles.* Lead articles varying in length from about 1000 to 10,000 words are invited for consideration. These may be general articles or reviews of recent advances in some field. Authors should keep in mind the broad audience of *Science* and should employ reasonably nontechnical language that will be intelligible to most readers.

2) *Reports and Letters.* All articles commonly called technical papers and communications, as well as letter-to-the-editor type of comments, are now placed in one department. Reports of research should be limited to four double-spaced, typewritten pages (about 1200 words). This includes the space occupied by figure or table, references, and author's name and affiliation. However, statements of conclusions without supporting data will not be accepted. *Such data should be included to the extent necessary.* Illustrative material should be limited to one table *or* one figure.

Brief announcements of completed work or observations varying in length

from several sentences to approximately 600 words will usually be given priority for publication. These may be reports of significant research that will be described in detail in an archive journal. Supporting data or a comprehensive account of the work should be included in the letter of transmittal for the guidance of the referees.

Letters to the editor are usually comments on previously published articles.

Every effort will be made to publish papers promptly. This will require the cooperation of authors, who should follow these suggestions: (i) give special attention to concise expressions; (ii) supply clear figures that unquestionably are suitable for reproduction; (iii) see that manuscripts are submitted in the form and style used by *Science,* especially with regard to references, figure legends, table headings, and abbreviations; (iv) on the galley proof, limit alterations to typographic and factual errors; (v) return galley proof promptly.

Every article, communication, or book review is accepted with the understanding that it has not been published or accepted for publication elsewhere. (Occasionally an important article is reprinted from, or simultaneously printed with, another periodical, usually one not readily available to readers of *Science,* but this is always done by special arrangement with the author.)

An article should receive a thorough review before submission, if possible by someone other than the author. If a manuscript is returned to an author for a thorough revision, the revision date will be regarded as the "Received" date for the article.

All manuscripts are to be submitted in duplicate, in order to expedite reviewing by referees and editorial processing. In the event that a paper is returned to an author for revision, one copy will be retained in the editorial office pending final disposition.

Preparation of Manuscript

For the first copy of the typescript, use a good grade of bond paper, 8.5 by 11 inches. *All copy, including quotations, footnotes, tables, literature references, and legends for figures, should be double-spaced.* Leave margins of at least 1.5 inches at the sides and at the top and bottom. Pages that are heavily corrected should be retyped. Do not insert corrections and additions lengthwise in the margin; the printer works with the typescript mounted in a frame that exposes only a few lines at a time.

Changes in copy and proof. All corrections in manuscript *and* proof should be transmitted to the editorial office in Washington, *not* to the printer.

Illustrations. A brief legend should be provided for each diagram, graph, map, and photograph. It should *not* be incorporated in the figure. All legends are set in type by the printer and, hence, should be typed double-spaced, on a separate sheet of paper.

On the margin or back of each illustration, write in pencil the number of the figure, name of the author, and abbreviated title of the article. All illustrations should be packed carefully with cardboard to avoid damage in mailing. Cracks and marks made by paper clips or pressure of writing ruin photographs for reproduction.

Line drawings should be made with India ink on heavy white drawing paper or blue tracing cloth. Ruled coordinate paper may be used for graphs, provided that it is printed in light blue; the important coordinate lines and scale markers that are intended to appear in the reproduction must be ruled in India ink.

A good size for a drawing is twice that desired for the printed figure, with all lettering and line thicknesses similarly enlarged. One-column-width illustrations are reproduced 2⅛ inches wide; two-column width illustrations, 4-9/16 inches wide; three-column width illustrations, 6-15/16 inches wide.

Diagrams containing little detail should be planned so that the printed figure can be made one column wide. For presenting apparatus, a line drawing is usually better than a photograph.

Photographs should have a glossy finish. For satisfactory reproduction, a print must be unblurred and must show sharp contrast between light and dark areas.

When it is desirable to indicate the magnification in photomicrographs, the scale in microns (or other suitable units) should be drawn directly on the print rather than indicated in numerals in the legend. This allows more flexibility in scaling for reduction and, hence, greater accuracy in indicating size of the subject.

Tables, Each table should be typed on a separate sheet and should be provided with a title. Tables should be numbered consecutively with Arabic numerals.

References and notes. The only footnotes are to be those appended to tables and the author's affiliation in lead articles. All other explanatory notes, including acknowledgments and authorization for publication, and literature references are to be numbered consecutively and placed at the end of the article, under the heading "References and Notes."

Date of publication. Although an author will not be notified of the particular issue in which his paper will appear, receipt of galley proof is a fair indication that publication is imminent—usually within 3 weeks. If such a schedule is to be maintained, it is essential that the author mail his corrected galley proof to the editorial office (1515 Massachusetts Ave., NW, Washington 5, D.C.) within 24 hours after receiving it, and that he refrain from making extensive alterations.

Reprints. Reprint orders are handled by the printer, Business Press, Inc., Lancaster, Pennsylvania. An order form will be sent to the author along with the galley proof. If reprints are desired, this form should be filled out and promptly returned to Business Press. Any subsequent correspondence *concerning reprints* should also be addressed directly to Business Press. In the case of authors living outside the U.S.A., the printer requires payment in advance for reprints and postage.

Preparation of Graphs

These suggestions do not comprise a comprehensive set of suggestions but merely emphasize certain practices that often are disregarded. Most of the recommendations are in accord with those made in American Standards Association publication Z15.3.

Not more than three or four *curves* ordinarily should be shown on the same graph, although more may be included in the case of a family of well-separated curves. Use a solid line for an especially important curve and dashed, dotted, or lighter solid lines for the other curves. No curve or coordinate ruling of the graph should run through any lettering or outlined circles, triangles, and so forth, that are used to indicate plotted points.

Coordinate rulings should be limited in number to those needed to guide the eye in making a reading to the desired degree of approximation. Short scale markers, or "ticks," may be inserted between rulings if this is desirable. The rulings should be light enough not to distract attention from the curves being presented.

Lettering should be placed so as to be easily read from the bottom and from the right-hand side of the graph; that is, the lettering should face either the bottom or the right-hand side of the drawing.

Explanatory comments, supplementary data, or formulas should be placed in the figure legend or in the text. The exception to this rule is the case where there are several curves on the same graph that need separate identification; if practicable, they should be identified by brief labels placed close to the curve (horizontally or along the curve) rather than by single letters or numbers requiring a key.

If it seems necessary to place supplementary information on the drawing proper, the lettering should be kept within the vertical and horizontal limits of the curves or other essential features of the drawing. Otherwise the space occupied by the drawing may be needlessly

large, or else the drawing may have to be reduced in reproduction, often to the point where the lettering or other details are illegible.

Scale captions should be placed outside the grid area, usually at the bottom toward the right for the horizontal scale and at the left-hand side toward the top for the vertical scale. The scale caption should consist of (i) the name of the variable plotted, (ii) its symbol, if one is used in the text, and (iii) in parentheses, the abbreviation for the unit of measure; thus, Pressure p (lb/in.^{2}). Avoid using such captions as "Pressure in lb/in.^{2}" and "Pressure in lb per sq. in." The technical terms, symbols, and abbreviations on a drawing should be in accord with those used in the text of the article.

The *horizontal and vertical scales* for a graph should be chosen with care, so as to give a correct impression of the relationship plotted, for the choice of scales has a controlling influence on the apparent rate of change of the dependent variable. Except where a visual comparison of plotted magnitudes is important, the bottom (abscissa) and extreme left-hand (ordinate) coordinate lines need not represent the zero values of the variables plotted: this often results in a more effective graph as well as a saving of space.

The numerals representing the scale values should be placed outside the grid area. If the scale values are smaller than unity and are expressed in decimal form, a cipher should always precede the decimal point; thus, 0.20, not .20.

The use of many ciphers in scale numbers should be avoided, and the best way to do this is to reexpress the quantity plotted in terms of a larger unit of measurement. For example, suppose that originally the scale numbers are 15 000, 20 000, 25 000 . . . and that the scale caption is "Pressure (lb/in.^{2})"; these scale numbers can be changed to 15, 20, 25 . . . , provided that the unit is changed to 10^3 lb/in.^{2} If, in this example, the data are correct to three significant figures and it is desirable to indicate this fact, then the scale figures should be 1.50, 2.00, 2.50 . . . , and the unit, 10^4 lb/in.^{2} *Never* use captions of the types: "Velocity $\times 10^3$ in ft/sec" and "Velocity (ft/sec $\times 10^3$)." They are ambiguous, since they do not indicate clearly whether the scale numbers *have been* or *are to be* multiplied by 10^3.

Book Reviews

In general, unsolicited book reviews are not considered for publication. The editors reserve the right to reject solicited reviews.

Anyone who undertakes to prepare a book review has accepted certain obligations: to the author, to the publisher, to the editor, to the reputation of the journals, and especially, to the reader.

The reviewer should consider what a reader might like to know about a book. Is it a good book of its kind? In what way is it better or worse than its predecessors? What field does it cover? To what audience is it addressed? If the book is written for a popular audience, the reviewer should judge how successful it is for that audience. Would it be a good book to own? How well does it fulfill the stated aims of the author? If it is not a first edition, how has it been changed, if at all?

The reviewer owes it to the author, who has undoubtedly spent much time and effort on the book, to be fair. He should not magnify minor errors out of proportion to their importance, but he should point out without rancorous or polemical outbursts any weaknesses, important errors, or misconceptions. In short, the reviewer should give an appraisal of the book, not of the author. If it is a generally good book with some faults, or a generally bad book with some good points, this should be made clear to the reader. If the book lies outside the field of the reviewer's competence, which may mean that its title is misleading, he should return it to the editors, or, if someone he knows is competent both in the field of the book and in writing reviews, he should turn the book over to him for review and *notify* the editorial office. If the book does not merit a review, the editorial office should be notified promptly.

Promptness in a book reviewer is an especially desirable virtue. The longer the lapse between publication of a book and its review, the less valuable the review.

Reviews should be no longer than necessary. An optimum length is between 200 and 300 words, an approximate upper limit is 650 words. The length of a review need not be proportional to the merit of a book. In fact, the relation may be one of inverse proportion, for a book with some merit and many defects may require a long review.

The writing should be clear and concise, and the reviewer should remember that he is writing for some nonscientists as well as for specialists in one or another field of science. The reader should be able to tell whether or not the books reviewed in fields other than his own have merit. A librarian, for example, should be able to decide from the review whether or not the book in question should be purchased for library use.

News of Science

Nuclear Tests

The U.S. Atomic Energy Commission announced on 2 Apr. the sixth atomic explosion by the Soviet Union in the last 8 months. A Soviet test series, which included one large hydrogen blast, started last summer. Three smaller explosions were detected in August and two more have been reported this spring.

The announcement followed by a few hours word from the AEC that 15 newsmen and Civil Defense officials will be permitted to observe a United States nuclear test at the Pacific proving grounds at Eniwetok about 1 May. The AEC spoke of it as a "megaton range nuclear detonation." One megaton is the equivalent of 1 million tons of TNT.

The United States set off a hydrogen explosion at Eniwetok in March 1954 with a force reportedly equivalent to 14 million tons or more of TNT. By comparison, the Hiroshima atomic bomb yielded the equivalent of 20,000 tons of TNT.

The State Department has sent a note to the Japanese Government concerning the Pacific nuclear tests that includes the following statements.

"The United States is second to none in its desire for the safeguarded control and reduction of armaments, including nuclear weapons. . . .

"The United States Government is convinced that the proposed nuclear tests are vital to its own defense and the