

making (Kuno, Rosenblueth); for others, history is in discontinuity (Bykov, Häusler). Physiology appears to lose ground where no public appreciates its worth.

The authors indicate that in most countries there is little or no physiology outside of medical institutions; actually, representatives of other brands of physiology were not heard from. All but two of the 17 contributors are shown in portrait; the portraits are inadequately reproduced. There is no index. Some errors

of dates and spelling of proper names mar the book.

The general reader will correctly gather that physiologists around the world are factual folk who deal precisely with special and limited varieties of abstractions. Physiologists believe in laboratories, scientific lineage, instinctive behaviors, and what they are doing. They also have abiding faiths in a future that is socially hazardous.

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## Communications

### Ten Commandments for Technical Writers

*At the last session of the Conference on Scientific Editorial Problems at the AAAS Berkeley meeting, Elmer Shaw read these ten commandments for technical writers. He wrote them as a result of listening to the speakers in the first-day sessions.*

- 1) Thou shalt remember thy readers all the days of thy life; for without readers thy words are as naught.
- 2) Thou shalt not forsake the time-honored virtue of simplicity.
- 3) Thou shalt not abuse the third person passive.
- 4) Thou shalt not dangle thy participles; neither shalt thou misplace thy modifiers.
- 5) Thou shalt not commit monotony.
- 6) Thou shalt not cloud thy message with a miasma of technical jargon.
- 7) Thou shalt not hide the fruits of thy research beneath excess verbiage; neither shalt thou obscure thy conclusions with vague generalities.
- 8) Thou shalt not resent helpful advice from thy editors, reviewers, and critics.
- 9) Thou shalt consider also the views of the layman, for his is an insight often unknown to technocrats.
- 10) Thou shalt write and *rewrite* without tiring, for such is the key to improvement.

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### That and Which Again

It was a pleasure to re-read the charmingly humorous Christmas piece reprinted from *The New Yorker* [*Science*, 120, 7A (1954)]. But I have wondered again, as I did on first reading the article, whether the editor of *The New Yorker* seriously believed that the Bible could help us use *that* and *which* in the ways that would now be regarded as correct. And now I must also wonder whether the editors of *Science* believe it,

since they tell us they reprinted the piece in the hope of softening the hearts of certain contributors who had been incensed at their "which hunting." Be that as it may, the reprinting seems to invite discussion of the use of *that* and *which* by Fowler, St. Matthew, and others.

The practice advocated by the Fowler brothers (joint authors of *The King's English*) is the most rational that has been described in print, and yet I believe it could be slightly improved. Their rule is, briefly: Use *that* for defining clauses, and *which* for nondefining clauses. They also appear to regard any clause properly begun with *that* as restrictive, and therefore not to be preceded by a comma, unless the comma be one of a pair enclosing a parenthesis ("the house, as you know, that Jack built"). They also appear to assume that any clause properly begun with *which* is supplemental, and therefore must be preceded by a comma. I do not think the correlation between pronoun and punctuation is quite so close, but in order to justify that view it is necessary to consider the difference in function between the two kinds of clauses.

*Defining* will serve to describe the proper function of a *that* clause, provided that we use the word in a rather broad sense. A *that* clause could rarely serve as a dictionary definition of the antecedent. What it generally does is to identify, or characterize, the antecedent by distinguishing it from other things (or rarely persons) of the same class. A clause properly begun with *that* can therefore be aptly described as a *distinguishing* clause.

*Nondefining*, the term the Fowlers apply to clauses properly begun with *which*, is not very useful, for it fails to tell us what such a clause does; it merely tells us one thing that it does not do. The main purpose of a *which* clause, it seems to me, should be to give us information about the antecedent, and a proper *which* clause may therefore be called an *informing* clause, or an *assertive* clause when that word better describes its tone.

Almost every clause properly begun with *that* is in fact restrictive, and therefore should not be preceded by an unpaired comma, but there are cases, though they are very rare, in which this rule does not seem

to hold. Consider the following speech from *She Stoops to Conquer*. Young Marlow's traveling companion is blaming him for their having lost the road:

And all, Marlow, from that unaccountable reserve of yours, that would not let us inquire more frequently on the way.

The comma is necessitated by the presence of *your*, and it throws a fittingly ironical stress on *reserve*. But to use *which* in place of *that* would give the speech a smugly informative tone that would be quite out of key. The speaker is not informing Marlow of something that he knows only too well; he is characterizing his friend's "unaccountable reserve" by pointing to its deplorable result.

One would rarely, if ever, need to use a comma'd *that* clause. It is fairly often justifiable, however, to use a *which* clause that is not preceded by a comma—to use what I would call a "running *which*." A running-*which* clause may be to some extent distinguishing, but its dominant purpose is to inform or assert. This construction is most effective when the clause has an assertive, emotional tone, as in the following sentence from the Gettysburg address:

It is rather for us, the living, to rededicate ourselves here to the unfinished work which those who fought here have thus far so nobly advanced.

A comma before *which* would not violate grammar, but it would slow down the impulsive movement which now sweeps through the sentence, and it would make the *which* clause sound rather dryly informative. To substitute *that* for *which* would inflict more subtle damage, by making the clause appear to be purely distinguishing—as if its purpose were merely to distinguish this unfinished work from some other unfinished work. The clause does of course do that, in a way, but its distinguishing function is of minor importance, for every intelligent reader knows at once what Lincoln meant by "the unfinished work." The main purpose of the clause was not to distinguish, nor was it merely to give us dry information; it was to pay a feeling tribute to the Union soldiers who had fought at Gettysburg. Its tone is emotional, or assertive, and it may be taken as a classic example of the assertive running-*which* clause.

The practice of St. Matthew in using the relative pronouns—or rather the practice of the translators who made the King James Version of the Bible—differed widely from that of the Fowlers, especially where the antecedent was personal. In a recent skimming of some dozens of pages, I nowhere found *who* used as a relative pronoun, though I did find one *whom* (II Kings 25:22). The translators most commonly used *that*, as in "Who is he that is born King of the Jews?" To use *that* with a personal antecedent, at least in a distinguishing clause, is still permissible, but even those who like the sentence just quoted as much as I do would not want always to use *that* to the exclusion of *who*. And it would not be even permissible now to use *which* with a personal antecedent, as is sometimes done in the Bible. In Chapter 7 of St.

Luke, for example, we find "they which are gorgeously appareled," and "a woman in the city, which was a sinner." In two successive verses of St. Matthew himself, we find "unto him which hath" and "unto every one that hath." (Matthew 26: 28, 29).

With impersonal antecedents, the practice of the translators was not strikingly different from that of modern writers except in one respect: the translators apparently never used the compound relative *what*. The same sentence that contains the words "unto every one that hath" ends with the words "even that which he hath," whereas we would now write "even what he has." But the translators often used a *which* not coupled with *that* in a way that the Fowlers would not have approved, and I think they do so in the quoted sentence about the star (Matthew 2:2). The relative clause "which they saw in the east," placed as it is between paired commas, would appear to be giving us, parenthetically, a bit of new information. The fact it conveys, however, is not news, for we had recently been told (Matthew 2:2) that the wise men had "seen his star in the east." The clause is not informing but distinguishing; its purpose is to distinguish one bright particular star from all the lesser stars. It therefore should have begun with *that*; and there was no reason for putting commas around it.

If *which* were replaced by *that*, and three needless commas removed, the sentence would in my opinion be more logical and no less beautiful:

And lo, the star that they saw in the east went before them, till it came and stood over where the young child was.

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## Note on a New Literary Phenomenon

Americans are not a nation of readers; at least not readers of books. The American Institute of Public Opinion, reporting in 1954 on American habits and tastes, asked the question: Do you happen to be reading any book or books at the present time? Of the thousands queried, only 21 percent could or did answer affirmatively. But if few Americans read books they are at least definite concerning the kind of book they want them to be.

Publishers consider that any title that sells more than 100,000 copies in a year is a "best seller." By this standard the best-selling best seller in America today is a novel entitled *Not as a Stranger* written by the late Morton Thompson. This novel has been in print 2 years, and, while it is now down to seventh place on the *New York Times'* best-seller list, it remained No. 1 for more than 18 months. It has been through several editions, has been reprinted in a pocketbook edition, and is currently being made into a motion picture. It is estimated that some 5 million people have now read or are reading this book and