Use of "Personal Communications" in Scientific Reviews

The recent communications by C. Stern and A. L. Bacharach [*Science* **119**, 221 (1954); **121**, 313 (1955)] on citing unpublished articles prompt me to touch on another aspect of this problem: the frequent inclusion by reviewers of scientific literature of "personal communications" from authors whose work has not been published at the time the review is being written. I wish to emphasize that my remarks are directed not at authors of papers reporting original investigations, for whom "personal communications" may serve diverse functions, but at authors of scientific reviews, particularly of those that appear with calendar regularity. For them the disadvantages of including "personal communications" seem to outweigh the advantages.

The *Annual Review of Plant Physiology* has recently eliminated the use of "personal communications." The invitations to authors include a statement that

> . . . reviews should deal with published work only, with the sole exception of papers in press at the time the review article is submitted. A paper in press is defined as one accepted and not merely submitted for publication in a scientific journal whose name must be cited in the bibliography. It is permissible, however, to cite doctors' or masters' theses on file in a university library and papers actually presented (but not read by title only) at scientific meetings.

The arguments for including "personal communications" are chiefly that they give the reader access to the most recent developments in the field and contribute materially to the timeliness and freshness of the review. The arguments on the other side are, first of all, that the reader is denied the opportunity he rightly expects of being directed to the original evidence for an independent appraisal of its significance. When confronted with a "personal communication," the reader must either accept or reject its evaluation by the reviewer usually without himself having a sufficient basis of fact in either case.

The inclusion of "personal communications" in reviews poses a special problem when these pertain to new findings in an active field of research. A reviewer may be informed about unpublished findings made by workers known to him personally. Similar or even better founded evidence may have been in the hands of other workers unknown to the reviewer. The inclusion of "personal communications" from some workers prior to the normal publication of data would thus record in the scientific literature a priority of discovery in a sequence not always warranted by the facts.

Another shortcoming of "personal communications" is that they pertain to material which, being unpublished, has not been subjected to the scrutiny of editors and readers or, in the case of oral presentations at scientific meetings, of fellow-scientists in attendance. There is thus no way to judge whether a particular conclusion reached by the originator of a "personal communication" is well documented and merits serious consideration. It is conceivable that the use of "personal communications" may, if not checked, engender in certain individuals hazardous drawing of conclusions from insufficient evidence. If the idea were proved to be correct by subsequent and more extensive work, often by others, the "wager" would be won, whereas if the idea proved to be incorrect it might be expected to be easily forgotten.

These remarks are not intended to suggest that "personal communications" are necessarily unreliable but rather to stress the special problems that their use in reviews creates. "Personal communications" weaken the readers' prerogative of independent evaluation of the material cited by the reviewer.

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Arnold Arboretum Controversy

With reference to the news item [*Science* **121**, 416 (25 Mar. 1955)] stating that the controversy over the Arnold Arboretum of Harvard University has been settled, I have the following comments to make.

1) The controversy over the Arnold Arboretum has not been finally resolved. The *Harvard Alumni Bulletin* of 26 Feb. 1955, which is quoted in part in the news item, concedes that the controversy has merely come to "the end of a chapter."

2) It seems to beg the question to say that the removal of the bulk (about six-sevenths) of the library and herbarium from Jamaica Plain to Cambridge provides " more accessible quarters" for these components of the Arboretum. From the standpoint of the botany department at Harvard, these resources are more accessible, of course; but from the point of view of the Arboretum as it has developed into an integrated whole at Jamaica Plain, these books and specimens are inaccessible indeed.

3) The statement in *Science* regarding the decision of the Supreme Judicial Court in *Ames vs. Attorney General,* 11 Feb. 1955, is, I fear, misleading, in that it suggests that the Attorney General has authority to pass upon the question of whether or not there is a breach of trust. Only a Court of Equity can make such a determination. The *Ames* case merely decided that the Attorney General's decision regarding the use of his name in a petition for a declaratory decree as to the existence of a breach of trust was not reviewable by the Court. This is by no means the same thing as saying that the Attorney General himself has authority to issue a binding decree that a breach of trust does or does not exist.

4) The item in *Science* quotes the Court's summary of the Attorney General's decision and states that the Court allows the Attorney General's decision to stand. This conveys to the average reader the impression that the Court has confirmed the findings

or views of the Attorney General. Such is not the case. The Supreme Judicial Court did not examine the merits of the question of whether or not the Harvard Corporation was engaged in a breach of trust and did not sustain the Attorney General in his statement that there was no breach of trust. The Court stated that the action of the Attorney General in not lending his name to a suit was a purely executive decision and not subject to review by the Court.

On 15 Apr., the Association for the Arnold Arboretum, Inc., an independent organization of more than 1000 members from all parts of the United States and Canada, having no connection with Harvard and being opposed to Harvard's present plan for the Arnold Arboretum, issued a 12-page pamphlet entitled *A Review of the Arnold Arboretum Controversy.* Readers who wish to understand the persistent issues of this controversy may receive a copy by writing to our office, 50 State Street, Boston 9, Mass.

THOMAS V. RANKIN, *Executive Secretary*
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Role of Nitrogen Oxides in Formation of Engine Deposits

Although the presence of oxides of nitrogen in exhaust gases from automotive engines has long been recognized (*1*), the importance of nitrogen fixation with respect to engine deposits seems to have been overlooked. We have studied kinetically the extent to which the reaction

$$N_2 + O_2 \rightleftarrows 2NO$$

can take place during the operation of a gasoline engine; from the study it has been calculated that, under normal engine conditions, the temperature is sufficiently high and sufficient time is available for the formation of an appreciable amount of nitric oxide. Furthermore, we have shown by engine tests that the quantity formed is dependent upon the operating variables that affect time, temperature, and concentration of gases within the flame. Oxides of nitrogen are found in increasing amounts in exhaust gases as leaner air-fuel mixtures, higher loads, and increased spark advance (up to the point of maximum power) are employed; nitrogen oxide (measured as nitrogen dioxide) up to 0.8 percent by volume of the exhaust gas has been encountered (*2*).

We have observed also that oxides of nitrogen are reactants in the formation of low-temperature engine varnish. Their importance in varnish-forming reactions was strongly indicated in advance by the fact that analyses showed nitrogen to be present in appreciable amounts in hundreds of deposit samples taken from engine locations exposed to combustion gases. More nitrogen was present than could be accounted for by the natural nitrogen content of the fuel and lubricant or by that contained in the additives that might have been used. Chemical and spectral tests indicate that the bulk of the nitrogen in these engine deposits is in the form of aliphatic nitro groups.

A striking demonstration of the part played by oxides of nitrogen in varnish-forming reactions was effected by operating a test engine under low-temperature varnish-forming conditions with an artificial atmosphere composed of oxygen and carbon dioxide; varnish deposits were not formed. When, however, sufficient nitrogen dioxide was added to the artificial atmosphere to give a concentration approximating that usually found in exhaust gas, heavy varnish deposition took place. Variations on this experiment have confirmed these results.

Although varnish formed under low-temperature conditions appears to result from primary reactions involving either raw or partially oxidized fuel components and oxides of nitrogen contained in blow-by gases, further work indicates that at high operating temperatures varnish formation can, when certain oils are used, proceed in absence of nitrogen dioxide. Tests have been made with a stable nonvarnish-forming fuel and the oxygen-carbon dioxide atmosphere under engine conditions that caused severe oil deterioration. When a relatively unstable lubricating oil was employed with this combination, piston varnish was deposited. This suggests that engine varnishing may be attributed to at least two possible causes. (i) reactions between fuel materials and nitrogen dioxide when the engine is operating at a low coolant and oil temperature; (ii) oxidation reactions of unstable lubricating oil when the engine is operating under high-temperature conditions. Combinations of these mechanisms is obviously possible.

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References and Notes

1. A. C. Egerton and T. K. Hanson, *Proc. Roy Soc. London* **A163**, 90 (1937).
2. Details of the analytic method employed will be submitted elsewhere for publication.

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