

LETTERS TO THE EDITOR

TO THE EDITOR: ON THE S.I.

Your editorial [*Journal*, 257 (1971)] on Metrology has my complete sympathy. However, I would like to raise two points, one regarding an important omission and one pointing out the dangers in yielding to suggestions such as those made by E. B. Nauman in his letter [*Journal* 1017 (1971)].

Speaking to the latter point first, the issue at stake is to have a single coherent system of units to be used in all calculations by all scientists and engineers. For normal commerce or for the housewife, almost any collection of units would suffice. We in Holland still employ the inch measure for nails, and Mr. Nauman's corrosion rate may still stay in mm/yr—that is, until someone develops a theory to calculate it from first principles, in which case it would be developed and expressed in m/s. All compromises, such as those Mr. Nauman is seeking, would lessen the inherent simplicity of the system. Indeed, the full harvest of the S.I. can only be reaped if the English, cgs, and other conventional units are eradicated completely. One advantage of strict adherence to a single system is that people develop a better feeling for order of magnitude of numerical values, which is an important safeguard against mistakes.

Returning to my first point, I note that your conversion table for S.I. [*Journal*, 551-2 (1971)] ignores the molar unit, although for chemists and engineers this unit is essential. You are not alone. As late as 1968 the Royal Society Conference of Editors' manifesto on the S.I. [see *Am. Sci.*, 56 (2), 159 (1968)] was silent on molar units. In 1969, however, the Symbols Committee of The Royal Society, [see "Symbols, Signs and Abbreviations," The Royal Society (London, 1969)] adopted the mol as the seventh fundamental unit. It must be added that the International Standardization has been late in giving the proper leadership. Originally, molar units were considered an alternative kind of mass units ("so many units of mass as the molecular weight indicates"). It was overlooked that the "amount of matter" is not necessarily characterized by the mass. In this line of thought, amount of matter and mass was cancelled in the dimensional formula of the molar Gas Constant. This was very confusing.

When "amount of matter" becomes a seventh fundamental quantity with mol or kmol as its unit, the dimensionless "molecular weight" is better replaced by the dimensional "molar mass." Chemical engineers, accustomed to the use of lbmol and lb., immediately see that this calls for the kmol as the seventh fundamental unit in the S.I. so that in the above replacement the numerical value stays the same and even the symbol M can be taken over. Unfortunately, due to the insistence of chemists, the mol was adopted as the seventh fundamental unit in the S.I. with the kilomol only allowed.

Besides "molar units" one might also consider "molecular units," that is, to write "(per) particle" (molecule, ion, electron, quantum) in the expression for the unit. Since the molar and the molecular units are so vastly different in size, there is little risk of confusion. Consequently this further refinement is not worth the trouble. The Royal Society 1969 booklet, for example, gives the unit of the Avogadro Constant as "per mol." It is perfectly legitimate to retain the name Avogadro Constant for $N = 6 \cdot 10^{26}$ per kmol. Neither does metrication in the United States change the "Height of the Empire State Building."

Finally I encourage American engineers and scientists to take an active part in standardizing whole heartedly the S.I. units as they are adopted in the United States. One small yet obvious contribution would be to lobby for the kilomol as your seventh fundamental unit. In this manner the chemists' cherished unit of concentration, the mol/litre which is not a cgs unit, under its new name kmol/m³ becomes an S.I. unit.

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TO THE EDITOR:

I could not agree more completely with the editorial by H. A. McGee, Jr., that appeared in the November 1971 *AIChE Journal* entitled "Too Much Chemical Engineering Research is Dull . . . Dull . . . Dull." I might add, however, that through contacts with industry I believe that much more

stimulating research is being carried out in industry than in academic departments.

McGee states that "the *Journal* contents are a good representation of work in our academic departments, yet judging from both the comments and subscriptions of practicing engineers, their predominant attitude toward the *Journal* seems to be one of overwhelming disinterest and even obliviousness." I believe that the current state of dull research represented by the articles appearing in the *Journal* and the disinterest in reading the *Journal* can be laid partially at the feet of the *Journal* itself. Thirty-two articles appeared in the November 1971 *Journal* with an average time lapse between submission and publication of 16.2 months—the longest being 38 months and the shortest 8 months. To me this means that only the most uninteresting, non-current type of research is being published in the *Journal*. Any author with a new, relevant piece of research would surely publish his material in another journal which would promise that his article would appear in the shortest time possible.

I propose that one way more interesting ChE research could be represented in the *Journal* is for the average time between submission and publication be reduced to not more than 6 months. If, in addition, to shorten the publication time more effort was made to solicit articles of a current, relevant nature which are presently being published in other journals, we might start to see the *Journal* emerge as a carrier of current, fresh, stimulating articles.

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EDITOR'S NOTE: The *Journal* backlog is now such that the average time between acceptance and publication is five months. The goal to be reached in the Spring of 1972 is four months. Time from manuscript submission to review completion averages five weeks, and revision time is limited to no more than six months. The new format requirements constitute the start of a policy to encourage submission of relevant and, hopefully, even exciting papers in chemical engineering research and development.