# Letters

## Long Experience

The prestige and credibility of *Science* took a serious nose dive when the article by Nicholas Wade about Assistant Secretary Robert W. Long was published in the 17 January issue (News and Comment, p. 150).

To attempt to discredit Secretary Long's capacity to perform in this role because of his prior association with the Irvine Company or with the Bank of America, while completely overlooking the tremendous experience he has had in agriculture itself, in agriculture lending, and in agriculture leadership covering a wide spectrum of American agriculture is indeed to engage in the cheapest kind of demagoguery.

Then to quote later in the article from *Hard Tomatoes, Hard Times*, published by the Agribusiness Accountability Project, which is patently "out to get" agribusiness and which espouses a farm philosophy that borders on old-time Populism, further erodes the confidence in the article of any competent agricultural researcher who understands agricultural research. Indeed, practically every scientist in the agricultural research field resented the unfair and unfounded attack on the agricultural research establishment by the Agribusiness Accountability Project.

During the many years that I was active in agricultural research administration, I was a reader of *Science*. If *Science* carries any more unfair or unfounded articles like the one by Nicholas Wade, I shall not feel bad that I no longer have time to read the magazine.

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## SI Units and Thermal Energy

The major point of C. H. Lanphier's letter (6 Dec. 1974, p. 872) seems to be, "It would be most convenient if the basic unit of the thermal energy system had a one-to-one relation with the basic units of other (that is, electrical and mechanical) energy systems." This statement represents a fundamental misunderstanding of units in general, and of SI (International System) units in particular. If one wishes to describe a force, the proper unit is the newton, whether that force be exerted on a piston by a compressed gas or by one electric charge on another charge. If one measures power, the proper unit is the watt, whether the power be produced by waterwheel, electrical generator, or natural-gas furnace. Finally, the proper SI unit for energy is the joule, regardless of the form of energy—electrical, mechanical, thermal, kinetic, potential, and so forth—being described. To argue that different units are required for different "energy systems" is to argue in opposition to that summation of scientific experience embodied in the law of conservation of energy.

The confusion reflected in Lanphier's letter may have arisen from (or been reinforced by) the need to distinguish between the thermal power and the electrical power produced by, for example, a nuclear power plant. The answer to this problem, and to related ones, is to label the *quantity* rather than the *unit*; rather than writing "the power output of the plant is $x$ megawatts thermal and $y$ megawatts electrical," one should write "the thermal power $P_{th}$ is $x$ Mw and the electrical power $P_{el}$ is $y$ Mw."

A final minor point: Lanphier's use of the term "basic unit" does not conform to the SI, in which the term is reserved for the seven units (kilogram, meter, second, ampere, kelvin, candela, and mole) from which all other SI units are derived.

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The letter from Lanphier on thermal energy units is a quarter century behind the times.

In 1948, the General Conference on Weights and Measures, in its resolution (*1*) adopting the triple point of water for the thermometric reference point, stated: "3. The unit of quantity of heat is the joule. Note: It is requested that the results of calorimetric experiments be as far as possible expressed in joules."

Lanphier's proposal to compute the water-heating equivalent of a joule, and to define this as a "herg," is completely untenable. Incidentally, his use of "the prefix letter 'h' " would make his "herg" equal to 100 ergs, since the prefix letter "h" is internationally recognized as the symbol for the prefix "hecto."

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### References

1. National Bureau of Standards, *The International System of Units (SI)* (Government Printing Office, Washington, D.C., 1974).

Most of the articles and letters on the metric system have been focusing on the process of conversion instead of on the final goal: an absolute system, having a restricted number of interlocking units, which is used by everyone. If Lanphier had considered the SI only, he would have seen stated in his letter the only energy unit allowable for the thermal energy system (as for the mechanical energy system, the electrical energy system, or any other energy system), which is the joule.

Of greater concern is his assumption that the SI, in its present form, is logical. Weight is a force. The unit of force is the newton. Yet, in the SI system, weight is measured in kilograms. Is this logical? Even Lanphier implies that mass and weight are identical.

As an electrical engineer I applaud the universal use of the joule as the only energy unit because it improves communication. As a consumer I deplore the use of the kilogram as a unit of weight because it continually communicates a falsehood.

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## Water on Venus and Mars

Allen Hammond's fine report "Exploring the solar system (I): An emerging new perspective" (Research News, 22 Nov. 1974, p. 720) needs amending regarding water on Venus and Mars. Contrary to his statement that water vapor has not been detected on Venus, for several years our planetary group has been routinely observing water vapor in the atmosphere of Venus. Amounts vary from less than 1 to more than 80 micrometers of precipitable water detectable in the line of sight