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

which is finally stopped by the clouds. Large variations are seen both from point to point on the surface at a given time, and at a given region from day to day, which are effectively weather variations (*1*). A plausible reason, suggested by A. Young, as to why the detected amount of water is so relatively small at the rather high (240°K) temperature of the atmospheric region in question, is the very low vapor pressure of water over sulfuric acid cloud drops.

As for Mars, an alternative to loss of its water to space is the probability that large amounts of water may be locked in the crust as permafrost, also as ice crystals laid down in the great beds of aeolian deposits and in the polar caps of unknown depth. This picture is supported by the almost continuous subfreezing temperature of nearly all the martian surface, by the nevertheless near-saturation amounts of water vapor which we often find in the martian atmosphere, and by the tendency for the maximum atmospheric water vapor concentration to follow the subsolar point on Mars, both diurnally and seasonally (*2*).

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1. E. Barker, *Int. Astron. Union Symp. No. 65* (1974).
2. ———, *Bull. Am. Astron. Soc.* **6**, 371 (1974).

The Demese ef the Ne'enderthels: Wes Lengege e Fecter?

Et seems qwete prebeble thet the Ne'enderthels ked speke less well then ther seccessers, end thet thes wes the resen fer ther demese. Bet even ef we beleve the kempeter reselts (Research News, 15 Nov. 1974, p. 618), et seems emprebeble thet ther speech wes enedeqwete bekes ef the leck ef the three vewels seggested. The kemplexete ef speech depends en the kensenents, net en the vewels, es ken be seen frem the generel kemprehensebelete ef thes letter (*1*).

JEHN H. FREMLEN

Depertment ef Phesecs,
Eneversete ef Bermenghem,
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References

1. The neutral vowel throughout is "e," as in "her."

Kolata reports on a possible link between the disappearance of the Neandertals and their inability to use an easily understood language. However, there may be an organic cause for the disappearance of the Neandertal in addition to any language difficulties.

The Neandertals had a well-developed burial ritual. In many of the later burials it is evident that the skull had been opened to allow removal of the brain (*1*). Often the long bones are also cracked, apparently for the removal of the marrow. The treatment of the skull and bones suggests the use of rituals similar to those practiced by contemporary cannibalistic tribes in New Guinea and other places as documented by modern anthropologists. Such practices, in one place at least, have led to the development of a slow viral infection, kuru, in the population (*2*). The kuru virus is neurotropic and fatal. The infection leads to a complete degeneration of the nervous system due to the extensive viral multiplication within it. The virus may develop a long time after infection—10 to 30 years. It presumably is spread by the women and children (mainly female) eating the brains of a deceased member of the tribe or by allowing infected material to enter the bloodstream through cuts in the hands when the skull and bones are opened. Gadjusek (*2*), among others, has hypothesized that any tribe practicing cannibalism will develop a similar type of virus. The virus may arise from some animal reservoir but, in general, dies out in humans. However, cannibalism permits serial passage of the virus from human to human, thus increasing its virulence and infecting the population. The prevalence of this disease combined with increased devotion to cannibalism would lead to annihilation of a tribe, similar to that once facing the Fore in New Guinea. It has been suggested that the virus may survive in the earth surrounding the bones. Perhaps incubation of this earth would indicate its continued virulence (*3*).

Retardation in the development of a language on an anatomical basis could, of course, further decrease the chances of survival of the few remaining members of the tribe. A language problem would also isolate them from a larger competing population. We should include the possibility that, if the Neandertals were warring with the Cro-Magnons, their lack of ability to pronounce the vowels [a], [i], and [u] would perhaps have affected a "shib-