Letters

Brown Dwarfs

M. Mitchell Waldrop's commentary on the faint companion of van Biesbroeck 8 as the first known "brown dwarf" (Research News, 4 Jan., p. 44) brings to mind a limerick written by Edward Upton about 20 years ago:

> Van Biesbroeck's star is so faint
> It's either a star or it ain't.
> There has even been talk
> That it's only a rock
> Covered with luminous paint.

Incidentally, astronomers almost universally use the plural form "white dwarfs," so by analogy the new class of objects should be called "brown dwarfs" rather than "brown dwarves."

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Dietary Fat Recommendations

I was surprised to read the letters by Steinberg and Lenfant, Rifkind, and Jacoby (8 Feb., p. 582) criticizing Gina Kolata's article about the National Institutes of Health Consensus Development Conference on Lowering Blood Cholesterol to Prevent Heart Disease (Research News, 4 Jan., p. 40). I thought the article was clear, factual, and fair. Kolata correctly reported that there is a genuine controversy in the biomedical community about *certain* aspects of the consensus panel's report.

Of the five major recommendations made by the panel, three dealt with high-risk adults (those with serum cholesterol values greater than 240 milligrams per deciliter) who require identification and treatment; one dealt with the control of obesity, and the last dealt with a blanket recommendation that all Americans, age 2 to 90, adopt fat-modified diets in the interest of preventing atherosclerosis and its complications. It was my observation that there was essentially unanimous support for four of these recommendations but not for the recommendation that all Americans consume fat-modified diets.

Of the 24 speakers at the conference, 10 expressed reservations about the need for universal diet modification. The 600 persons attending the conference were not polled, so one does not know their stand on the crucial point of recommending diets for persons at very low risk, namely, children, women before menopause, and men with serum cholesterol values below 210 milligrams per deciliter. The evidence for benefit from diet modification in these groups is lacking. In fact, the American Academy of Pediatrics (*1*) is on record as opposing the recommendation of diet modification for healthy children.

Thus the only clear consensus in the conference was among members of the panel, which consisted of 14 health professionals, many of whom were committed by virtue of previous declarations to programs of global intervention to prevent coronary heart disease.

Science makes progress only through experimentation, argumentation, and debate. The issue of dietary fat modification for the entire population is an intensely controversial one and not an artifact of Kolata's reporting. The issue is one of science, not politics. These arguments will continue despite the complaints of the chairman of the panel and administrators of the National Heart, Lung, and Blood Institute who organized the conference.

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Acid Deposition

Philip H. Abelson, in his editorial "Effects of SO_2 and NO_x emissions" (14 Dec., p. 1263), concludes that action to reduce pollutant emissions in the United States would be premature. This conclusion is not supported by information available in the scientific literature and in government reports.

Abelson emphasizes the potential significance of NO_x emissions, but the primary cause of chronic *p*H depressions in surface waters is sulfur deposition, which contributes 80 percent or more (*1*) of the mineral acidity in acidified clearwater lakes. The fate of sulfur emmisions not deposited in wet precipitation, source-receptor relationships for sulfur, and recent changes in lakewater chemistry, described as "unknown" by Abelson, are extensively discussed in the literature (*2, 3*).

Abelson states that "the focus of abatement efforts probably should be NO_x" to protect forests in the United States, in part because NO_x is a precursor of ozone. While ozone is phytotoxic and is probably a major source of tree damage in parts of Southern California, the potential impact of acid or sulfate cannot be ignored. Recent studies (*4, 5*) report sulfate concentrations in Southern California fog and clouds in both urban and forested areas that exceed by an order of magnitude the average sulfate concentration in acid rain in the eastern United States. The potential relation of such high concentrations to tree damage has also been noted (*4, 6*), along with possible ozone-acid synergisms. Annual average ozone concentrations at one location where the forest has died back, Whiteface Mountain, New York, are well below the 6 parts per hundred million chronic exposure level noted by Abelson as associated with visible damage. However, cloudwater sulfate concentrations are high (*7*).

The "alarming" mortality in European forests, observed in the course of just a few years, followed anomolies similar to those being reported here (*8*). Therefore, it does not seem to us that "in the United States there is time to seek knowledge."

Because there is now compelling evidence that surface water acidification cannot be avoided if sulfur dioxide emissions are not reduced by one-half or more (*2, 9, 10*), it is neither necessary nor prudent to await clarification of all sources of forest damage before acting to protect aquatic systems. Such reductions in emissions, by slowing the chemical alteration of soils and reducing cloud, fog, precipitation, and dry-deposited acidity will also provide some benefit to forests. The probable need for additional NO_x controls does not reduce the benefits to be derived from sulfur control.

The costs of acid rain damage are paid year in and year out as action is slowly pondered. Future risks to resources are substantial. With this understanding, blue ribbon committees of scientists (*10, 11*) have called for expeditious action to

reduce pollutant emissions causing acid deposition. In this context, Abelson's position is both unconvincing and puzzling.

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Fuel-Efficient Automobiles

In their article "Technological trends in automobiles" (10 Aug., p. 587), E. J. Horton and W. D. Compton of the Ford Motor Company describe various ongoing technical developments in the auto industry and the possible configuration and fuel efficiency of an "average" new car sold in the late 1990's. The car described by Horton and Compton is quite similar to the medium-sized car projected for the year 2000 by the Office of Technology Assessment (OTA) in 1982 (*1*).

However, as Horton and Compton point out and OTA emphasized in its report, the actual fuel efficiencies achieved by automakers will depend on the demand for efficient cars. Vehicles like the ones described by Horton and Compton and by OTA will not emerge full-blown from the drawing board into mass production. Rather, numerous incremental changes will be introduced into the assembly lines; and automobiles will evolve toward these vehicles, provided each change helps automakers to sell cars (*2*).

In 1981, each of the big three U.S. automakers estimated that their corporate average fuel economy (CAFE, or sales-weighted fuel economy as measured by the Environmental Protection Agency) would reach or exceed 30 miles per gallon (mpg) by 1985 (*3*), which would have been well above the 27.5 mpg CAFE mandated for 1985 by the Energy Policy and Conservation Act of 1975. Since then, however, demand for fuel efficiency in new cars has weakened. And for the sales period from 1 January 1984 to 31 July 1984, only 5 of the 20 best-selling, domestic automobiles had models (specific sets of options) with fuel economies of 27 mpg or more (*4*).

Some of the weakening in demand for fuel efficiency may be attributable to the 30 percent drop in real gasoline prices (corrected for inflation) since their peak in 1981, although real gasoline prices are still 25 percent higher and real crude oil prices 55 percent higher than in 1978 (*5*). While recovery from the recent economic recession and the inevitable drop in U.S. crude oil production (*6*) are likely to increase the pressures on world oil prices, no one can say when or how rapidly oil prices will go up. And if the demand for fuel-efficient automobiles remains slack through a good part of the 1980's, it seems likely that the very fuel-efficient automobile described by Horton and Compton and by OTA may not appear until well into the 21st century.

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Horton and Compton state that the "horsepower needed to propel a vehicle against aerodynamic drag is given as C_dAV^3." That is incorrect. At best, the *power* (in fundamental units) is given by $\frac{1}{2}\rho\ C_dAV^3$, where ρ is the air density in slugs per cubic feet and the other parameters are given in square feet and feet per second.

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Erratum: In equation 6 of the Research Article "Effects of age on dopamine and seratonin receptors measured by positron tomography in the living human brain" by D. F. Wong *et al.* (21 Dec., p. 1393), $C_p(t)$ in the denominator of the last term should have been $A_{cb}(t)$. This does not affect the rest of the derivation. In the caption of figure 1, the first word, "Decrease," should have been "Change." The data in parts A and B of figure 3 should have been regraphed on common axes to facilitate comparison. A corrected figure 3 is shown below.