Letters

The Merck Index Online

I was surprised to read in Jeffrey L. Fox's article "EPA dumps chemical data system" (News and Comment, 16 Nov., p. 816) that "ICI [Information Consultants Incorporated] plans to put the contents of [*The Merck Index*] on-line."

The Merck Index editorial staff has been working closely with a number of database vendors during the past 2 years. We hope to complete *The Merck Index Online* by January 1985 and will announce at that time the vendors through whom the online version will be available. Although one meeting was held with ICI, we are not considering them at the present time.

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The Twitch: A Cautionary Tale

I suspect that the report by Evert Lagerweij *et al.* (14 Sept., p. 1172) and subsequent correspondence (Letters, 12 Oct., p. 116) concerning the use of a twitch to grasp the upper lip of a horse could well lead to an undesirable experience for an innocent research worker with too inquiring a mind.

I have a thoroughbred who is a gentle and noble creature and generally gives the lie to the wounding epigram that a horse is dangerous at both ends and uncomfortable in the middle. A few days ago, two young helpers set out to clip his winter coat. They had been warned to clip only his body and not to clip his head—a process he does not enjoy. Nevertheless, in my absence, in order to give him the smartest possible appearance, one applied a twitch to his upper lip, another the clippers to his head. The consequence was that one of the pair was forced by the outraged animal to flee the stable, whilst the other was severely concussed and needed to recover in the hospital.

I hesitate to suggest either that the above experiment is repeatable or that it is possible to design an experiment which disproves my theory that a twitch applied to a horse does *not* induce analgesia or sedation, even though it might win submission. I relate all this merely as a cautionary tale to prevent any of your readers from being lulled into a false sense of security when dealing with the twitch and the equine species.

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Firewood Conservation

A new study (*1*) by Earthscan (News and Comment, 9 Nov., p. 676) argues that worldwide efforts to address firewood shortages have not significantly improved the situation. While this assessment is accurate, it does not consider the causes of the failure, which may well be an overemphasis on promoting reforestation and new energy sources to the detriment of initiatives that would encourage firewood conservation.

The Khumbu Valley of Nepal is a case in point. This majestic region, which descends off the slopes of Mount Everest, has been devastated by deforestation. Over the past three decades, demand for firewood has steadily increased, leaving fragile hillsides nearly barren and forcing villagers to travel long distances for their fuel supplies. The Nepali government, with support from foreign aid agencies, has responded with ambitious tree-planting programs, as well as restrictions on woodcutting in damaged areas. In addition, alternative energy projects have been developed, including a 30-kilowatt hydroelectric scheme in the main village of Namche Bazaar.

But in the near future, these efforts will not show measurable benefits. Trees grow slowly in the harsh Khumbu climate, often taking 60 years to reach maturity. Although the reforestation may help stem erosion, it will be several generations before the local people can harvest firewood. The Unesco-backed hydro project only provides enough power for lighting and a small number of electric hot plates. Displacement of firewood demand is minimal.

Conservation measures, however, have great potential for alleviating the firewood crisis. Currently, the people of Khumbu use stoves that waste a large portion of the wood burned. They continue this practice despite the existence of more efficient stoves that could accomplish the same cooking tasks with 30 to 40 percent less fuel. The new stoves have already been successfully introduced into some Nepali villages.

Such programs must be dramatically expanded, as proposed in a report to the Nepali government last year (*2*). Reforestation can complement conservation, but the latter strategy will have better results, in less time, and at less cost, than any efforts directed at producing more firewood.

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References and Notes

1. E. Eckholm, G. Foley, G. Barnard, L. Timberlake, *Fuelwood: The Energy Crisis That Won't Go Away* (Earthscan, Washington, D.C., 1984).
2. A. C. Stern, "Promoting firewood conservation in Nepal's Sagarmatha National Park: A strategy for survival" (Report to His Majesty's Government of Nepal, Department of National Parks and Wildlife Conservation, Kathmandu, September 1983).

Colin Norman does not mention one means whereby the United States might help slow the deforestation of the Third World. Our country could help the poor of many developing nations by supplying them with smokeless solid fuels of low sulfur content. As Norman notes, the rich in these nations often burn kerosene, at great cost to the nations' economies; the poor must burn wood. Even a nation with coal is granted only a wretched third choice: in India, for example, many poor women breathe smoke from the bituminous coal they burn when they cook dinner. India has built at least one large plant—designed in India—to convert subbituminous coal to smokeless solid fuel for cooking. India's resources are not sufficient to build many plants of this type quickly. We could help India and other Third World nations by shipping either anthracite or smokeless fuels manufactured from low-sulfur bituminous coals of the East and subbituminous coals of the West. Most countries could easily manufacture cheap braziers in which to burn smokeless fuels.

Expanding anthracite production quickly would not be easy, but many coal mines in the low-sulfur bituminous coal district of southwestern Virginia, southern West Virginia, and eastern Kentucky are either idle or working at reduced capacity. This district has not recovered from the recent recession; un-

employment is high, and prospects for return of prosperity are bleak. One plant in the district, producing metallurgical coke in a modified beehive furnace, practices such thorough postcombustion of volatile matter that the plant's neighbors cannot believe it is operating because its stack is so clean. A furnace of this type could produce a smokeless fuel containing roughly three-quarters of the coal's original volatile matter at a rate roughly double the furnace's output of coke. The fuel would ignite more readily than anthracite, and new furnaces of this type could be built and placed in operation within a year. Furnaces of other types could come into production quickly in the subbituminous coal district of Wyoming and Montana.

Our nation's programs of foreign aid have assisted wheat farmers by distributing their product to the world's hungry. Isn't it time for foreign aid to assist our impoverished miners while also helping to preserve the world's forests?

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Evolution: An Expanded View

J. G. Kaplan (Letters, 19 Oct., p. 240) writes that recent evidence concerning the inheritance of environmentally induced traits in plants (Research News, 29 June, p. 1415) does "not constitute evidence for, or even bear on, 'the Lamarckian concept of evolution' " because the traits involved were not obviously adaptive. I think such a dismissal is a bit hasty.

1) Lamarck referred to the use or disuse of parts over long periods under a particular environmental circumstance and recognized imperfect intermediates. Further, he was not at all precise about how he intended his scheme to apply to plants, although he clearly did intend so. But even today we do not suppose that an evolutionary mechanism must produce an adaptive character as an immediate consequence; drift and meiotic drive come to mind.

2) If indeed nature produces heritable acquired traits that are adaptive, we are not likely to know it until we establish whether acquired traits can be inherited at all. The apparent affirmative evidence from plant breeders, along with a plausible mechanism (genomic rearrangement), seems to me to be as exciting a discovery as that of particulate inheritance. To suggest that it does not bear on Lamarckian evolution because it is not prima facie proof misses the point.

3) There is no question here of Lamarck versus Darwin. The current ferment in evolutionary theory appears to be heading toward an expanded view of evolution in which many processes and individual circumstances play a part. Finding a legitimate case of adaptive Lamarckian inheritance would not likely sweep the last century of Darwinism aside. Rather (I suspect) such a finding would take its place as yet more evidence for the influence of developmental processes on evolutionary modification. At any rate, one should not impugn the evidence at hand as heresy, nor use Lamarck as bogeyman or straw man.

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The Garrison Project and Drainage Divides

The article, "Day of reckoning for the Garrison Project" by Constance Holden (News and Comment, 31 Aug., p. 904) perpetuates a misconception. In North Dakota, the Missouri River drainage basin is not separated from the Hudson Bay drainage basin by a narrow drainage divide, as shown in the map accompanying the article. Rather, the two are separated by a belt of interior drainage in which surface drainage flows neither to the Hudson Bay nor to the Gulf of Mexico (*1*, p. B107). This belt is only about 30 kilometers wide in the northwest, but widens to about 80 kilometers in the southeast.

It also has a northeastern extension that is even wider, about 150 kilometers. Thus, much of the precipitation falling on the state that runs off the surface remains in the state until it is evaporated, transpired, or otherwise disposed of.

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References

1. I. G. Grossman, *U.S. Geol. Survey Prof. Paper 600-B* (1968), p. B104.

Erratum: In the article "Nuclear magnetic resonance technology for medical studies" by Thomas F. Budinger and Paul C. Lauterbur (19 Oct., p. 288), equation 2 on page 290 was printed incorrectly. It should have read:

$$\mathbf{S}(t) = \eta \int d\mathbf{r}\rho(\mathbf{r}) e^{-t/T_2} e^{-2\pi i \mathbf{r}\gamma \int^t \mathbf{G}(t')dt'}$$