LETTERS

Mercury in the Ocean

Beary (Letters, 14 Dec. 1979, p. 1260) makes the point that whale meat contains high concentrations of mercury (methyl mercury). If this information were to have the effect of discouraging Japanese whale harvesting, the result would be most salutary. However, some points of fact are not quite accurate as stated in the letter.

First, the data indicating that whale meat contains about 2 parts per million (ppm) of mercury have been known for some time (*1*, p. 54). Japanese regulations allow up to 0.4 ppm of mercury in fish. This is somewhat lower than the U.S. standard, which in practice now permits concentrations in swordfish as high as 1 ppm. Because whale meat is generally only an occasional source of protein in any person's diet, the Japanese authorities evidently have not felt it necessary to eliminate whale as a foodstuff; it is unlikely that restating this information now is any more likely to have an impact than it did previously.

Second, industrial activity may be justifiably indicted for polluting much of the ecosystem, but Beary's statement placing blame for mercury in the ocean is unsupported. Hammond (*2*) estimates that, if all the mercury processed by man since 1900 were poured into the oceans and well mixed, the average mercury concentration in seawater (0.1 part per billion) would be increased by at most 1 percent, which amounts to an insignificant contribution. Analysis of museum specimens of tuna and swordfish show that fish caught 25 to 100 years ago have mercury concentrations in the same range as those caught recently (*3*). Like sperm whales, these fish are deep-water predators and are generally well isolated from industrial activity. The mercury concentrations observed in such fish result from the animals' diets, their long life-spans, and the slow rate at which they excrete methyl mercury (half-times on the order of 1000 days) (*4*).

The third point is one of emphasis. Beary states that methyl mercury is concentrated in the cells of the nervous system. In fact, mercury concentration in the brain is slightly below the average for the total body; the remaining tissues and organs thus constitute the major reservoir of the chemical (*5*). From excretion kinetics, it is further evident that the brain is not a special, isolated compartment of the body in methyl mercury poisoning (*6*). The sensitivity of the brain, in particular the cerebral cortex, to methyl mercury appears to be peculiar to biochemical or structural aspects of the brain not shared by other organs rather than to any remarkable concentration effects of the nervous system.

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References

1. R. C. Herdman, in *Mercury, Mercurials, and Mercaptans*, M. W. Miller and T. W. Clarkson, Eds. (Thomas, Springfield, Ill., 1971).
2. A. L. Hammond, *Science* **171**, 788 (1971).
3. G. E. Miller, P. M. Grant, R. Kishore, F. J. Steinkruger, F. S. Rowland, V. P. Guinn, *ibid.* **175**, 1121 (1972).
4. T. W. Clarkson, *CRC Crit. Rev. Toxicol.* (1972), p. 203.
5. L. T. Kurland, in (*1*), p. 23.
6. T. W. Clarkson, H. Small, T. Norseth, *Arch. Environ. Health* **26**, 173 (1973).

Centennial "Fireworks"

The dazzling centennial fireworks display on the 4 January cover of *Science* bears an uncannily close resemblance to the Giacobini-Zinner meteor shower of 9 October 1933 as depicted on page 255 of *Astronomie* [L. Rudaux and G. de Vaucouleurs, Eds. (Larousse, Paris, 1948)]. In the *Science* version the first magnitude star Vega appears in the upper left, three of the four stars of the head of Draco remain near the radiant, and fragments of the Big and Little Dippers are visible at the lower right and middle right, respectively.

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An Unpublished Reply

In 1978, an autobiographical article by L. S. Pontryagin was published in the *Uspekhi Matematicheskikh Nauk* (*1*), which contained, in particular, the following paragraph:

> In following the Soviet point of view in the Executive Committee of the I.M.U. [International Mathematical Union] we sometimes met with serious opposition from other members, but there were others who warmly supported us. One of the most serious problems that we had to deal with was the new composition of the Executive Committee for the period 1974 to 1978. There was an attempt by the Zionists to take the International Mathematical Union into their hands. They attempted to raise Jacobson, a mediocre scientist but an aggressive Zionist, to the presidency of the I.M.U. I managed to repel this attack. Now, having left the Executive Committee, I would like to think that the situation has improved markedly as regards this problem.

It is by now clear that *Uspekhi Matematicheskikh Nauk* will not publish Jacobson's reply, notwithstanding an exchange of letters between Jacobson and P. S. Aleksandrov, *Uspekhi*'s editor in chief. This is in contrast to the treatment accorded Pontryagin by *Science*, where his long reply to accusations of anti-Semitism was published on 14 September 1979.

Jacobson needs no defense. Mathematicians familiar with his work realize that to call him a "mediocre scientist" is as absurd as to allege that he was to become president of the I.M.U. because of a "Zionist" or any other plot. (As a matter of fact, Jacobson became a member of the executive committee of the I.M.U. in order to serve out the term of the late A. A. Albert, and with a firmly declared intention not to accept any I.M.U. position after that.)

The article by Pontryagin tells a great deal about him and nothing about Jacobson or the I.M.U. We deplore this unprecedented attack, and we are deeply disappointed that the editor of *Uspekhi* would not or could not give to our distinguished colleague the elementary courtesy of enabling him to reply.

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References

1. L. S. Pontryagin, *Usp. Mat. Nauk* **33**, 203 (1978).