Letters

AAAS and NAS Herbicide Reports

The letter from Kenneth V. Thimann regarding the military use of herbicides in Vietnam (19 July, p. 207) is mistaken in stating that ". . . the NAS [National Academy of Sciences] committee [on the effects of herbicides in Vietnam] completely failed to find evidence to support the claims of the earlier three-man AAAS [herbicide assessment] commission." In fact, there is substantial agreement between the findings of the two groups, as may be confirmed by reading their published reports (*1–3*) and as indicated in the following brief summary.

Birth defects and stillbirths. The AAAS commission made no claim that birth defects or stillbirths have been shown to result from herbicides. Reviewing data from the only large pediatric hospital treating congenital malformations before 1968, the AAAS commission reported that for most defects there had been no major increase in relative admission frequencies during the decade 1959–1968. Exceptions were noted for two specific defects, spina bifida and pure cleft palate, particularly the latter. The commission concluded that, "It would be important to examine these trends more closely. Still, this could never prove a causative connection with herbicides" (*1*, p. 6807). Maternity records inspected by the AAAS commission at the provincial hospital in a very heavily sprayed province showed an unusually high frequency of stillbirths, but this was cited only as reason for additional investigation. The NAS committee was unable to study these records, nor were the previously mentioned congenital defects specifically followed up. Both groups are in agreement that there is, at this time, no proof of an association of congenital defects or stillbirths with herbicides, but that more studies such as the one being continued by the NAS are certainly justified.

Herbicide residues in soil. Having obtained no suitable samples of sprayed soil, the AAAS commission made no statement on this subject. Thimann's letter is mistaken to suggest otherwise. Analyses conducted by the NAS committee led them to conclude that herbicide residues were generally well below the concentrations harmful to vegetation. Both groups strongly recommended study of the possibility that harmful amounts of the toxic herbicide contaminant TCDD (dioxin) may have entered the diet in some areas.

Reported deaths of Montagnards. Although the AAAS commission investigated reports of numerous Montagnard deaths from herbicides, it considered the available evidence insufficient and therefore made no reference to this matter, contrary to the impression given by Thimann's letter. It was the NAS committee, after extensive interviews with Montagnard villagers and checking of herbicide flight records, that stated, "Reports of Highlanders (Montagnards), in comparison with lowland Vietnamese, on death and illness caused by herbicides are so consistent that despite the lack of medical and toxicological evidence for such effects they cannot be dismissed out of hand and should be followed up as promptly as possible by intensive studies . . ." (*3*, p. S2437).

Inland forests. The quantitative estimate of inland forest damage is one of the more controversial aspects of the effects of herbicides in Vietnam. This is partly because various estimates of the richness of Vietnamese forests *before* spraying differ by a factor of more than 10 and because no group has surveyed the sprayed forests on the ground. Nonetheless, there is clear qualitative agreement between the two studies. For example, the AAAS commission reported that, "Aerial inspection of forests in a wide arc north of Saigon extending from the Cambodian frontier . . . to the South China Sea . . . showed more than half of the forest to be very severely damaged. Over large areas, most of the trees appeared dead . . ." (*1*, p. 6806). Similarly, the NAS committee reported, "During helicopter flights . . . from Saigon to Dong Xoai . . . , some 60 miles to the northeast, members of the Committee saw extensive areas of Closed forest in which virtually all of the larger and taller ('emergent') trees appeared to be dead . . ." (*2*, p. IV-5). And also from the NAS report: "Thus, the total damage, particularly in multiple-sprayed inland forest areas, was undoubtedly extensive and serious" (*3*, p. S2436). The AAAS commission in its report made no estimate of the cubic footage of merchantable timber destroyed, although it would certainly consider the estimate of the NAS committee to be too low. Thimann here takes no note of the "statements of exception" published as part of the NAS report. These were submitted by a distinguished Vietnamese botanist and by a renowned tropical forest scholar, both full members of the NAS committee and both of whom consider that the amount of timber destroyed has been seriously underestimated by their colleagues.

Bamboo invasion. The AAAS commission reported that, "Over large areas, most of the trees appeared dead and bamboo had spread over the ground. A danger in this is that the invading species may be essentially worthless and very expensive to eradicate. Bamboo will retard the reestablishment of forest trees, at least for many decades" (*1*, p. 6806). The NAS committee stated: "Information derived from limited field and aerial reconnaissance suggests that where herbicide spraying has led to the death of the forest tree species and suppression of their reproduction, bamboos, if present in the area—as they are in many but not all inland forest areas—tend to increase with establishment of pure stands, which may persist for many years" (*3*, p. S2435).

Mangrove forests. The AAAS commission estimated on the basis of observations made from the air that, "As a rough approximation, half of these forests, some 1,400 square kilometers, have been sprayed with herbicides" (*1*, p. 6806). The NAS committee, after study of nearly complete spray flight records estimated that 1050 square kilometers or 36 percent had been sprayed. Both groups are in close agreement as to the effects. Thus, the AAAS commission stated that, "Essentially all vegetation is killed. Preliminary . . . inspection by the Commission showed little or no recolonization . . ." (*1*, p. 6806). And the NAS committee stated that, "One spray usually killed all mangrove trees; large contiguous areas were devastated, and there has been little or no recolonization of mangrove trees in extensive sprayed areas, except along the margins of some of the canals . . ." (*3*, p. S2436). The statement apparently attributed by Thimann to the AAAS commission that the mangroves will not

regenerate for 100 years in fact comes from the NAS report: "An estimate based on a model suggests that, under present conditions of use and natural regrowth, it may take well over 100 years for the mangrove area to be reforested" (*3*, p. S2436).

Finally, on a subject not discussed by Thimann, the AAAS commission found that the crop destruction program, although largely confined to the Highlands, ". . . may have had a profound impact on a large fraction of the total Montagnard population of South Vietnam . . ." (*1*, p. 6807). While the NAS committee made no quantitative estimate, this concern is certainly supported by the NAS committee's Highland interviews and by its aerial photographic studies of crop damage and population displacement from both crop destruction missions and missions designated as defoliation.

The two groups, independently studying difficult problems under conditions far from conducive to scientific inquiry and in spite of some important unresolved questions, nonetheless arrived at remarkably similar conclusions.

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References and Notes

1. American Association for the Advancement of Science Herbicide Assessment Commission, "Preliminary report," and "Background material," *Congr. Rec.*, 3 March 1972, pp. 6806–6813.
2. National Academy of Sciences Committee on the Effects of Herbicides in Vietnam, *Effects of Herbicides in South Vietnam*, part A (National Academy of Sciences, Washington, D.C., 1974).
3. *Congr. Rec.*, 28 February 1974, pp. S2430–S2442.
4. The signers constitute the AAAS Herbicide Assessment Commission.

Language Skills of Homo sapiens

May I comment on the interesting debate about the "use of language" by chimpanzees between Mistler-Lachman and Lachman and Rumbaugh, Gill, and von Glasersfeld (Technical Comments, 6 Sept., p. 871).

While the arguments are splendid on both sides, is it not a pity that the language skills of *Homo sapiens* are nowadays so degraded? For example, "utilize" and "utilization" = use, while "We are fully cognizant of the fact" = we know.

My ancestors on the edges of Man's domain in the 18th and 19th centuries of your era would have grimaced to hear such verbiage from the lips of your early explorers. Please, *Homo sapiens scientificus*, keep your ancient skills.

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A Scientist's Campaign

Much has been said about the need for scientists to become directly involved in government. I tried. I recently made an unsuccessful attempt to get elected to the U.S. Congress.

My campaign for the Democratic Party nomination to the U.S. House of Representatives was against a well-intrenched incumbent in the diverse but largely conservative Sixth District of Maryland. My opponent supported the supersonic transport, the seniority system in Congress, maximally lenient strip-mining legislation, and the bombing of Cambodia. He opposed revenue sharing, increases in the minimum wage, funding for research on thermonuclear fusion, consumer protection legislation, and United Nations sanctions against the import of Rhodesian chrome. His voting record on environmental issues was rated 5 percent by the League of Conservation Voters. He has called for severe curtailment of government spending as a major means of bringing inflation under control. His votes have not been generous to science.

I received about 26 percent of the total vote, ranging from 18 percent in some precincts to 65 percent in others. My campaign cost about $5600, of which $2100 was from donations. The remaining $3500 was "loaned" by me to the campaign. My opponent received and spent over three times as much.

I spent $1950 to mail campaign literature and solicitations for funds to 20,000 fellow scientists. Only 60 responses were received, and these were largely from people that I knew personally. The money received was less than enough to pay for the postage.

While other interpretations are possible, the results of this experiment suggest to me that scientists in general are not yet sufficiently concerned about the influence of government upon their affairs to support reasonably qualified candidates who are clearly concerned about their interests.

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Iron in Enriched Bread

Weinberg's article "Iron and susceptibility to infectious disease" (31 May, p. 952) emphasizes a critical, but overlooked, aspect of iron metabolism. Weinberg points out that, since high iron levels in mammalian hosts favor bacterial invaders, infections such as tuberculosis may become activated, and other infections may result. He states that "if hosts are hyperferremic (because of . . . excess iron introduced by way of diet or infection). . . they are exceedingly susceptible to even a small number of invading bacterial or fungal pathogens." He also points out that low serum iron levels may be a defense against tumor cells.

In the light of these concepts, the attempt of the Food and Drug Administration to have bakers increase the iron content of enriched bread is irresponsible. Any further tampering with our food must be stopped.

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Fortunately, much of the iron added to flour is not assimilated (*1*, p. 48). However, research is needed to determine if nonassimilated iron alters intestinal microflora. Such alteration might be dangerous, especially in infants, and thus the proposal to fortify milk with iron must be considered very cautiously. Of some comfort are observations that "administration of iron to lactating cows, sows, and women is largely ineffective in raising the iron content of the milk to levels above normal" (*1*, p. 26).

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References

1. E. J. Underwood, *Trace Elements in Human and Animal Nutrition* (Academic Press, New York, ed. 3, 1971), pp. 14–56.