

# Letters

## Side Effects of 5-Thio-D-Glucose

T. H. Maugh II (Research News, 1 Nov., p. 431) reports that 5-thio-D-glucose may be a useful male contraceptive because it interferes with the metabolism of D-glucose, on which spermatogenesis is unusually dependent. Besides spermatogenesis and tumor growth, however, the metabolism of the brain is also heavily dependent on glucose metabolism. In fact, one of the most prominent symptoms of deficient glucose metabolism, usually caused by thiamine deficiency, is Korsakoff's syndrome, characterized by severe memory impairments. If further research is to be done on 5-thio-D-glucose, particular attention should be given to possible side effects of this drug on the brain.

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## Safety of Ultrasound Diagnosis

In her interesting and well-informed report on diagnostic ultrasound (Research News, 18 Oct., p. 247), Jean L. Marx describes the rapidly growing use of this modality in medicine and the considerable advantages it has in complementing the use of x-rays. As she states, it is a relatively safe method; there appear to have been no authenticated instances of damage to human tissue under the conditions usually employed.

It is to be hoped that this happy situation will continue. But as usage expands and users strive for ever-better sonic images, there will undoubtedly be a tendency to use higher intensities and longer exposure times. It is thus imperative to follow recommendations (1) that threshold determinations be made for the biological effects of ultrasound. "Crash programs" for determining threshold values may be useful,

but a long-term sustained effort will also be required. There are many relevant physical and biological variables, and the contributions of numerous investigators with varying kinds of insights will be needed in order to establish a framework of knowledge.

But even if precise threshold values of intensity and irradiation times were known for all significant biological effects, a physician would probably not be able to make use of the information because only a few manufacturers of ultrasonic medical devices provide data on output intensity with their instruments. The American Institute for Ultrasound in Medicine is now taking steps to improve this situation by encouraging its member physicians to request intensity specifications from manufacturers and by offering commendations to manufacturers who provide satisfactory data. At the same time the Bureau of Radiological Health is proceeding toward its goal of developing standards for ultrasonic devices used in medicine. It is increasingly recognized that medical use of ultrasound without knowing the intensity specifications is like administering a drug without knowing its contents.

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## References

1. J. M. Reid and M. R. Sikov, Eds., *Interactions of Ultrasound and Biological Tissues* (Government Printing Office, Washington, D.C., 1972); C. Kelsey et al., *Interaction of Ultrasonic Energy with Biological Structures* (Alliance for Engineering in Medicine and Biology, Chevy Chase, Md., 1974).

## Breast Cancer Treatments

Informed consent, although traditionally associated with questions of research, is equally applicable to questions of medical therapy within the doctor-patient relationship. The controversy surrounding the National

Surgical Adjuvant Breast Project (News and Comment, 18 Oct., p. 246) has centered on two issues. First, the National Cancer Advisory Board was concerned that patients were not receiving optimal medical care. Second, the Center for Law and Social Policy was concerned that women were not being fully informed when asked to participate in the project. Both issues ignore the basic problem: the information provided by practicing physicians to patients about modes of treatment when cancer of the breast is present.

Although life expectancy following radical mastectomy has not improved, and other types of surgical treatment for breast cancer are still being evaluated, surgeons in the United States continue to prefer, recommend, and perform the mutilating radical mastectomy. Patients should be told that breast cancer can be treated in more than one way and informed of the possible consequences of alternative modes of treatment.

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## Solar Ponds

Hudec and Sonnenfeld (Reports, 2 Aug., p. 440) discuss natural solar ponds, that is, bodies of water in which a density gradient of salt prevents convection and so allows the bottom temperature to rise considerably above ambient when sunlight is adsorbed at the bottom. They conclude that "density-stratified brines in natural or artificial reservoirs should be reconsidered as solar energy collectors." Several discussions of solar ponds not referenced in their report indicate that what is now needed is not merely reconsideration, but experimental studies of the operation and maintenance of solar ponds of an area of 100 to 1000 square meters.

The first report of a natural density-stratified lake with an anomalous temperature gradient was by von Kálcinszky (1). The physics and technology of solar ponds, together with a limited consideration of economic factors, have been discussed by Tabor (2) and others (3). Furthermore, a detailed study of the cost and operation of solar ponds

for space heating has been made by Rabl and Nielsen (4). They conclude that the cost would be competitive with conventional heating systems over much of the United States. Recent increases in fuel costs have strengthened this conclusion.

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#### References and Notes

1. A. von Kalesinszky, *Ann. Phys.* 7, 408 (1902).
2. H. Tabor, in *Proceedings of the United Nations Conference on New Sources of Energy* (United Nations, New York, 1964), vol. 4, pp. 59-66; *Sol. Energy* 7, 189 (1963).
3. H. Weinberger, *Sol. Energy* 8, 45 (1964); J. R. Hirshmann, *ibid.* 13, 83 (1973); G. C. Jain, paper presented at the Paris Congress on Solar Energy, Paris, July 1973.
4. A. Rabl and C. E. Nielsen, *Sol. Energy*, in press. (Reprints may be obtained from C. E. Nielsen, Department of Physics, Ohio State University, Columbus 43210.)

Indeed, von Kalesinszky (1) may have been the first investigator to observe the phenomenon of heliothermal lakes in a brine produced from leached Miocene salts in Rumania. Experimentally, he proved the solar origin of the heating process.

However, in our report we discussed a stratified lake produced by natural concentration of sea water without leaching of older salts. Such stratification has also been observed by Smith (2) in salt pools of the Siwa oasis in Egypt and by Por (3) on the Red Sea shore, but a comprehensive bibliography of all hitherto reported occurrences has not been attempted.

This gives us an opportunity to correct an error: the trapped energy in Lago Pueblo is  $15 \times 10^8$  kg cal day<sup>-1</sup> and not  $15 \times 10^6$  kg cal day<sup>-1</sup>, as we reported.

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1. A. von Kalesinszky, *Földt. Közl.* 31, 409 (1901); *Z. Prakt. Geol.* 10, 105 (1902).
2. C. L. Smith, *Bull. Inst. Egypte* 28, 139 (1947).
3. F. D. Por, *Rapp. P.-v. Réun. Comm. Int. Explor. Scient. Mer. Méditerran.* 20, 511 (1972).

#### Herbicide Use in Vietnam

Both the article by Deborah Shapley (News and Comment, 22 Mar., p. 1177) and the letter from Kenneth V. Thimann (19 July, p. 207) concerning the work (1) of the National Academy of

Sciences (NAS) Committee on the Effects of Herbicides in Vietnam (of which I was a member) contain distortions. The real issues are the data, reasoning, and conclusions of the committee, not the areas of disagreement among the committee members, nor the personal characteristics of the committee members and the NAS report reviewers.

It is misleading and in some respects not correct for Thimann to say that the NAS committee failed to find evidence to support the claims of the AAAS commission.

1) The evidence regarding birth defects is still under examination, with support from the NAS.

2) Some herbicides persisted in the soil of some sprayed areas (1, Sec. V, pp. V-1 to V-8).

3) Although there was no direct medical evidence to support reports that Montagnard children died from spraying, it is inappropriate to label the reports "unsubstantiated rumor." The information received from numerous interviews with Montagnards from several areas was internally consistent, was verified as to time and place of spray, and was generally consistent with reports of illness in interviews with lowland Vietnamese [1, p. S-14, Sec. VII-B(2), and Sec. VIIC].

4) Although the NAS committee's estimate of damage to the inland forest was about one order of magnitude lower than previously published figures, the committee estimated that the equivalent of approximately 2 years of commercial lumber production was destroyed in South Vietnam. The report states clearly that there was also extensive damage to growing stock (below merchantable size) and to seed sources, especially in the multiply sprayed areas [1, Sec. IV-B(3), pp. IV-77 to IV-87].

5) The committee was unable to substantiate allegations of extensive areas being seeded by bamboo as a result of herbicide spraying, but bamboo stands, presumably from vegetative sources, were observed in some sprayed areas [1, Sec. IVB(2), p. IV-19].

6) If the total ecosystem, including human activities, is considered, the rapid cutting of pole-sized mangrove trees is clearly a result of the killing of most of the trees by herbicides (1, Sec. IVC and Sec. VIIC).

Some conclusions of the NAS report were overlooked by both Shapley and Thimann.

1) The committee investigated the

hypotheses that illness might be associated with exposure to herbicides either from the direct physiological toxicity of the agents or directly from epidemiologically significant ecological changes caused by the herbicides. The reports of illness given by people exposed to herbicides have the ring of authenticity. They are large in number, widespread in origin, and collected and evaluated by experienced interviewers using generally accepted techniques. They describe a series of symptoms many of which could reasonably be expected to be associated with herbicide agents, and they do not conform to official propaganda lines of either side in the conflict. In at least one community where deaths were reported following the sprays we have independent medical evidence that children did die (of malaria) after the spray (1, Sec. VIIB and Sec. VIIC).

2) The evidence is completely consistent with the hypothesis that herbicide-induced alteration of the environment created conditions favoring reproduction of malaria vectors, and the conclusion is reasonable that malaria may be a serious and widespread secondary effect of widespread use of herbicides [1, Sec. VIIA(3)].

3) There may be debate on the exact value of destroyed crops and forest products, but there is absolutely no doubt that crops and forest products were destroyed, and that this destruction had (and may continue to have) important economic effects on people who depend on these resources.

The NAS committee was not in the business of evaluating herbicides as a weapon, and thus did not consider potential military benefits. Undoubtedly there were some military benefits to Americans, but anecdotes from some American military personnel suggested that herbicides also sometimes had negative tactical effects as well. Beyond this, of course, I wonder if it is appropriate to consider only American lives, and not think of the lives of the Vietnamese and Montagnard villagers whose land was sprayed and whose crops were destroyed.

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#### References

1. National Academy of Sciences Committee on the Effects of Herbicides in Vietnam, *The Effects of Herbicides in South Vietnam: Part A, Summary and Conclusions* (National Academy of Sciences, Washington, D.C., 1974).