Letters

Esophageal Cancer

Kmet and Mahboubi have done a fine survey on esophageal cancer in the Caspian littoral of Iran (25 Feb. 1972, p. 846). In their article, they make reference to the high incidence of esophageal cancer among the Bantu people living in the Transkei region of South Africa (*1*). It has now been shown (*2*) that the Bantu consume significant amounts of *N*-nitrosodimethylamine, a compound which has been shown to cause esophageal cancer in rats (*3*). The source of the *N*-nitrosodimethylamine is the juice of *Solanum incanum* fruit, which is used for curdling milk. It may be that the same carcinogen or a related one is present in the diet of the people of Iran, in the regions where a high incidence of esophageal cancer is found.

EDWARD LEETE
National Products Laboratory, School of Chemistry, University of Minnesota, Minneapolis 55455

References

1. R. J. W. Burrell, W. A. Roach, A. Shadwell, *J. Nat. Cancer Inst.* **36**, 201 (1966).
2. L. S. DuPlessis, J. R. Nunn, W. A. Roach, *Nature* **222**, 1198 (1969).
3. H. Druckrey, R. Preussman, G. V. Blum, C. Ivankovic, *Naturwissenschaften* **50**, 90 (1963).

The admirable study on esophageal cancer in the Caspian littoral of Iran is typical of the desperate searching for "real" causes of cancer in such factors as soil characteristics and rainfall patterns. Indeed, it may lead to some incredible hypothesis explaining why these specific 150 persons were the victims out of the usual 100,000 at risk.

My tone is critical, and is meant to be. Perhaps investigators biased toward the out-dated medical model of disease should review the series of letters in *Lancet (1)* about the scarcity of urinary tract calculi in people who speak Bantu. This trait crosses geographic, ethnic, and ecologic lines and adheres to a linguistic-cultural distribution. Further, it appears that speaking only Bantu is the thing to do if one prefers not to get multiple sclerosis. A study by Geoffrey Dean (*2*) indicated no reported cases of multiple sclerosis among the 11 million Bantu in southern Africa; the incidence among whites who spoke Afrikaans was 3 per 100,000, but among English-speaking whites it was 11 per 100,000.

I am not saying that the language is causative. Japanese women are noted for their fantastically low rate of breast cancer, but Japanese women who act, think, and talk as if they were American wives join the latter in their unusual predilection for breast malignancies.

Much of our thinking is modified by the nature of the language we learn, and distorted language is then reflected in inappropriate behavior. Such considerations, plus the infinite number of other observable and nonobservable factors in the total field lead to a more coherent, although still partial, picture of the individuals being studied. Psycholinguistic, postural, emotional, and all other known aspects of human behavior should be as carefully analyzed as the rainfall or the flora. Such things as malnutrition, "permanent pregnancy," constant breast feeding, and other catastrophic living conditions can then perhaps be evaluated in terms of the degree of depressive reaction that occurs when these individuals process their perceptions of so-called reality through the revealing-distorting lens of personal language.

Sooner or later, the complexities of subjective behavior must be breached; I wish the researchers would stretch their grant dollars to allow just *one* sincerely put question, in the cancer patient's own dialect: "How long were you miserable and unhappy and depressed and angry *before* you started to have trouble swallowing?"

W. C. ELLERBROEK
Metropolitan State Hospital, 11400 Norwalk Boulevard, Norwalk, California 90650

References

1. Annotations, *Lancet* **1967-I**, 889 (1967); W. G. Robertson, M. Peacock, B. E. C. Nordin, *ibid.*, p. 1007; B. Lewis, G. L. Caplan, P. H. Fry, *ibid.*, p. 1111; M. Modlin, *ibid.*, p. 1162; S. N. Salem, *ibid.*, p. 1223; H. P. Wassermann, *ibid.*, p. 1270; W. Houston, *ibid.*, p. 1271; B. Lewis, G. L. Caplan, P. H. Fry, *ibid.* **1967-II**, 46 (1967). G. T. Nurse, *ibid.*, p. 262; H. Gordon, *ibid.*, p. 312; H. P. Wassermann, *ibid.* p. 718.
2. G. Dean, *Brit. Med. J.* **2**, 724 (1967).

Leete suggests that nitrosamines may be responsible for the high rate of esophageal cancer noted by us in Iran. Nitrosamines as a possible etiological factor to be investigated in our joint study in Iran were discussed at meetings of the Advisory Committee on Environmental Carcinogens of the International Agency for Research on Cancer (IARC) which took place in June 1970 in Omaha, Nebraska, and in May 1971 in Teheran, Iran.

The main problem is to find satisfactory methods for analysis of *N*-nitroso compounds in complex and diverse materials such as foodstuffs, as the methods used in some earlier studies have proved to be not reliable. IARC is currently carrying out intra- as well as extramural research for the development and standardization of appropriate analytical methods.

In March 1973, a pilot environmental chemistry study including nitrosamine analysis will be started within the framework of our epidemiological study in the Caspian littoral of Iran.

JANEZ KMET
EZATOLLAH MAHBOUBI
International Agency for Research on Cancer, World Health Organization, 16, Avenue Maréchal Foch, 69, Lyon (6 ème), France

Hydrogen Embrittlement

In addition to the safety factors discussed by Thomas H. Maugh in his article "Hydrogen: Synthetic fuel of the future" (Research News, 24 Nov. 1972, p. 849), it must be kept firmly in mind that hydrogen degrades the mechanical properties of many structural alloys, a phenomenon referred to by metallurgists as "hydrogen embrittlement." Instances of hydrogen-induced failure in practical components and structural components are well documented in the engineering literature. The factors controlling hydrogen embrittlement are complex, and imperfectly understood. Nevertheless, it should be pointed out that under appropriate circumstances hydrogenated steels may fracture un-

expectedly in a brittle fashion at alarmingly low stresses, often after having sustained much higher stresses for a substantial time. For a given hydrogen potential, the susceptibility to hydrogen brittleness generally increases as the basic strength of the steel is increased.

A hydrogen economy would require a substantial increase in the capability to contain and transport hydrogen. It is not at all clear that this can be accomplished by a straightforward expansion of current technology. Nor is it clear that proponents of the hydrogen economy are sufficiently aware, or indeed aware at all, of hydrogen's degrading effects. The brittleness induced by hydrogen is not an insurmountable barrier to a hydrogen economy, but to date the problem has not received sufficient attention to allow, for example, a rational design for a hydrogen pipeline network.

H. H. JOHNSON
Department of Materials Science and Engineering, College of Engineering, Cornell University, Ithaca, New York

Drug Abuse

The letter from Michael M. Baden (29 Sept. 1972, p. 1152) which is critical of the excellent summary by Thomas H. Maugh of research on narcotic antagonists (Research News, 21 July, p. 241) is itself in need of criticism. Baden may be correct in his two points that (i) abuse of methadone and overdose deaths more frequently result from oral administration than from injection and (ii) the amount of paregoric being abused is only a very small fraction of the total amount being consumed. However, Baden does not appreciate the contribution of parenteral abuse to problems associated with present oral administration nor why a more useful parenteral deterrent is essential.

The effect of methadone, when it is taken parenterally by addicts, is either indistinguishable from that of heroin (*1*) or may indeed be preferred to that of heroin (*2*). Accordingly, attempts have been made to prevent parenteral methadone abuse. Patients who have take-home privileges are provided either with solutions (for example, Tang) or with some solid dosage (such as the Disket), which, because of irritating properties when it is directly ingested orally, must be dissolved before use. These forms of dosage, which have been designed to prevent parenteral abuse, unfortunately have not accomplished their objective, as they are either directly injectable (*3*) or can readily be prepared for injection (*2, 4*). Worse, however, is that their use has led to many deaths from methadone overdose. When given methadone in solution, the patient is not told the concentration in the mixture, nor is the bottle labeled. A solution containing 40 milligrams procured one day by a street addict may provide satisfaction and relief from withdrawal effects. On another day, a solution of identical appearance but containing 100 milligrams may be lethal. Tang solutions or Disket solutions are pleasant-smelling and attractive-looking. Young children drink them "eagerly" with disastrous results (*5*). Naloxone combined with methadone in a truly nonfilterable dosage form would prevent parenteral abuse, eliminate the need for all liquid preparations, and undoubtedly result in fewer lethal doses administered by both oral and parenteral means.

The paregoric question also needs to be clarified. Effective 4 June 1972, a prescription was required for paregoric in all 50 states (*6*). The reason, as described in the *Federal Register* (*7*), is that "abuse of paregoric by addicts who process it into a form for intravenous administration is well known and well documented in the medical literature . . . it is in the public interest for paregoric to be restricted to prescription sales." The housewife who previously obtained a few cents worth of the popular old remedy from her corner pharmacy must now incur the additional expense and trouble of an appointment with a physician and a prescription for the drug—all because of a small degree of addict abuse. Both the Food and Drug Administration and the Bureau of Narcotics and Dangerous Drugs have expressed interest in returning paregoric to over-the-counter status if abuse can be prevented. As little as 1 milligram of naloxone in each 100 milliliters of paregoric can make such abuse a thing of the past.

IRWIN J. PACHTER
Bristol Laboratories, Syracuse, New York 13201

References

1. D. R. Jasinski, U.S. Addiction Research Center, Lexington, Ky., personal communication; K. Goodall, *Psychol. Today* **6**, 136 (1972).
2. J. H. Jaffe, F. Kirkland, K. K. Kaistha, *Arch. Gen. Psychiat.* **25**, 525 (1971).
3. R. C. Wolfe, M. M. Reidenberg, V. Dinoso, *Ann. Inter. Med.* **76**, 830 (1972).
4. W. Anderson, *New York* (14 Feb. 1972), p. 49.
5. W. R. Cranley and P. E. Haddow, *N. Engl. J. Med.* **284**, 792 (1971).
6. *Fed. Reg.* **37**, 6734 (1972).
7. *Ibid.* **36**, 20306 (1971).