

"to fudge is human." But because of that very fact, we should be ready to admit the possibility that we may, perhaps almost unconsciously, have committed a fudge, or overlooked one by someone else. Recently, when Dingle (1) and others suggested that there is something wrong—call it a mistake or call it a fudge—with the theory of relativity, what they encountered could scarcely be described by any term other than "persecution." Earlier, O'Rahilly, who had rather similar experiences, said that the heretic is treated worse in physics than in theology. We should remember that a theory which is to a great extent true may still be fudged here and there; those who point this out are in the same position as physicians who tell us that, while we are mainly healthy, we have such and such an illness, which fortunately can be cured.

H. L. ARMSTRONG

Department of Physics,
Queen's University,
Kingston, Ontario, Canada

Reference

1. H. Dingle, *Science at the Crossroads* (Martin Brian and O'Keeffe, London, 1972).

While reading Westfall's article I was reminded of an anecdote told by the late J. C. McLennan during a lecture at the University of Toronto about 40 years ago.

McLennan said, as I remember, "One time I remarked enthusiastically to Nils Bohr, how wonderful it was that his equations yielded such an accurate value of Rydberg's constant. Nils said to me 'Of course, McLennan, I made it come out that way.'"

McLennan then said to us, "Perhaps that is the difference between Nils Bohr and me."

ARTHUR H. BOULTBEE

70 Bush Avenue,
Greenwich, Connecticut 06830

In reply to McHugh, I am unable to find in Newton's language any grounds for the assertion that he offered the two corrections to the velocity of sound as hypotheses to account for the discrepancy. He did not present them in such a manner. Moreover, he assigned "quantitative exactitude" to them, and did so without any evidence external to the calculation that such "side effects" even exist.

RICHARD S. WESTFALL

Clare Hall, Herschel Road,
Cambridge, CB3 9AL, England

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Effects of Marijuana Use

John Kaplan's review (12 Jan., p. 167) of the recent American and Canadian government-sponsored reports (1, 2) on cannabis does justice to neither.

Like the British Wootton Report of 1968 (3), these North American studies did, indeed, recommend a more humanitarian approach to the legal issues. What Kaplan fails to mention is that the reports contain much cautionary clinical material which led both the American commission (1, p. 134) and the Canadian commission (2, p. 301) to conclude, as had the British committee (3, Section 71), that the use of marijuana was to be discouraged for various individual and public reasons.

These reasons are perhaps best stated by the Canadian commission (2, p. 274):

To sum up, then, it seems to us that there are at least four major grounds for social concern: the probably harmful effect of cannabis on the maturing process in adolescents; the implications for safe driving arising from impairment of cognitive functions and psychomotor abilities, from the additive interaction of cannabis and alcohol, and from the difficulties of recognising or detecting cannabis intoxication; the possibility suggested by reports in other countries and clinical observations on this continent, that the long-term heavy use of cannabis may result in a significant amount of mental deterioration and disorder; and the role played by cannabis in the development and spread of multi-drug use by stimulating a desire for drug experiences and lowering inhibitions about drug experimentation.

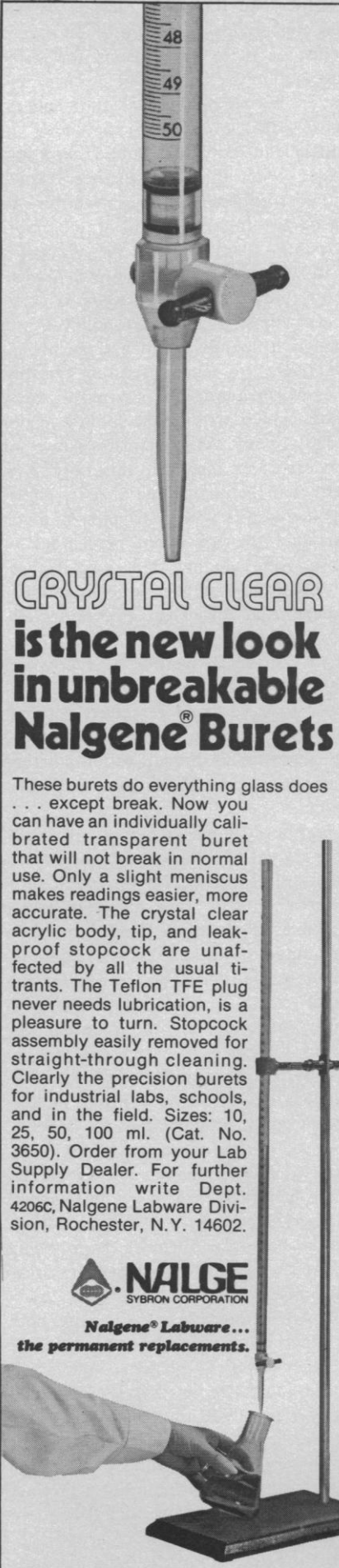
A number of people have discontinued the use of cannabis because of these and other problems, and even continuing users are becoming more willing to admit that—as Gabriel Nahas demonstrates in his excellent coverage of the subject (4)—marijuana is a "deceptive weed."

CONRAD J. SCHWARZ

Student Health Service and
Department of Psychiatry,
University of British Columbia,
Vancouver 8, Canada

References

1. National Commission on Marihuana and Drug Abuse, *Marihuana: A Signal of Misunderstanding* (Government Printing Office, Washington, D.C., 1972).
2. Commission of Inquiry into the Non-Medical Use of Drugs, *Cannabis* (Information Canada, Ottawa, 1972).
3. Advisory Committee on Drug Abuse, *Cannabis* (Her Majesty's Stationery Office, London, 1968).
4. G. G. Nahas, *Marihuana: The Deceptive Weed* (Raven, New York, 1972).



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Of course there are reasons for social concern over the use of marijuana—just as there are reasons for social concern over the use of aspirin and butter, not to mention alcohol and tobacco. If we confuse the issue of whether an individual should use a substance with that of whether society should forbid his doing so, we may be laying the foundation for tragic errors in public policy.

Reliance upon the criminal law to control marijuana is, in terms of cost-effectiveness, a very bad policy—even though it sounds tough and hardheaded. There are several reasons for this.

1) Marijuana use, compared to many things which are freely tolerated in our society, is not *that* much of a cause for concern. For instance, not only is it clear that the percentage of users harming themselves with marijuana is much less than the equivalent percentage of those using alcohol, but, with respect to the driving of automobiles, studies indicate that the driver who is socially intoxicated on marijuana is very little, if any, more dangerous at the wheel than the nonintoxicated driver (as opposed to a vastly larger effect with alcohol). Indeed, this follows from the fact that it is so difficult to tell whether someone is under the influence of marijuana.

2) The criminal law does not really have a great effect in discouraging marijuana use—at least by the population at greatest risk. The drug is freely available to the young today, both in the United States and Canada, and only the more mature, stable, and older elements of the population are significantly influenced by the criminal law in this regard.

3) When the criminal law is used as a means of marijuana control, we pay a price out of proportion to the benefits. Drug education tends to be nullified, since it inevitably comes to be regarded as the handmaiden of law enforcement. Moreover, the danger to the individual's mental health and future from being arrested is much worse than from using marijuana.

4) All of the above are reasons both for decriminalization (no penalty for the user but no legal sales) and for licensed sale. The provision of licensed sale will come when we realize that prohibiting legal sales of marijuana has simply resulted in turning over to the drug culture the marketing of a product which cannot be suppressed. When we understand this we will regard the licensed, taxed, sale of the drug to adults

as a better method of “discouraging” use than is our present across-the-board prohibition—regardless of the “grounds for social concern” about the drug itself.

JOHN KAPLAN

*Stanford Law School,
Stanford, California 94305*

Source of PCB's

The Research News report “DDT: An unrecognized source of polychlorinated biphenyls [PCB's]” by Thomas H. Maugh II (11 May, p. 578) requires critical comment, as three observations conflict with the hypothesis Maugh describes.

1) All PCB's lighter than heptachlorobiphenyl are more volatile than DDT (1).

2) The PCB's found in the environment by my group (11 May, p. 643) and others are almost always the 54 to 60 percent chlorinated mixture, that is, penta- and hexachlorobiphenyls. Di- and trichlorobiphenyls, which could be from DDT, are almost never found.

3) The ratio of PCB's to DDT in the atmosphere, water, and biota of the East Coast and the open Atlantic is always greater than 10. That would require DDT to be converted in very high yield to all penta- and hexachlorobiphenyls, which is clearly impossible by vapor-phase photolysis.

The idea is a good one, but none of the worldwide observations of PCB's in the environment support it.

GEORGE R. HARVEY

*Department of Chemistry,
Woods Hole Oceanographic Institution,
Woods Hole, Massachusetts 02543*

Reference

1. I. C. T. Nisbet and A. F. Sarofim, *Environ. Health Perspect.* 1, 21 (1972).

Psychosurgery

In her report on psychosurgery (16 Mar., p. 1109) Constance Holden brings up fears of certain individuals that psychosurgery is being used to “manipulate” or “repress and vegetabilize the helpless: the poor, the women, the black, the imprisoned, and the institutionalized.”

Such a movement, either local or widespread, is news to me. As a neurosurgeon who has performed most of the different types of psychosur-

gery mentioned in Holden's report, my purpose in becoming so involved has been to give selected patients greater freedom to live a normal life—freedom from pain, freedom from self-destructive impulses, or freedom from aggressive antisocial impulses. The alternative for many of these patients is to be kept in restraints almost continuously, tied to a bed or chair, restricted to a locked room essentially bare except for a mattress on the floor.

Neurosurgeons ought to favor sensible guidelines and criteria being set up by qualified medical and governmental agencies to protect patients from useless or unduly risky experimentation, whether by surgery, drugs, or electric current. Knowing that certain safeguards existed, the general public would have more confidence in the legitimacy of surgical procedures that are designed to improve overall brain function and enable a disturbed individual to have self-control over irrational impulses. Brain surgeons do not seek to control other peoples' thinking and behavior, only to help mentally handicapped individuals think and act in a way that will not cause their own destruction or that of some other innocent individual.

JOHN G. ZOLL

*State University of New York,
Buffalo 14215*

Trans-Science and Responsibility

Alvin M. Weinberg's distinction between “science” and “trans-science” (Editorial, 21 July 1972, p. 211) may be yet another device by which some scientists can evade their responsibility to protect the public against the hazards of low-level radiation. What Weinberg calls “trans-science” is not necessarily beyond the limits of science; it is merely beyond the narrow concept of science that currently prevails in the physical and biological sciences. It is well inside the limits of science from the standpoint of epidemiology or public health.

Weinberg's illustration of a “trans-scientific” issue is “the biological effect on humans of very low level radiation.” He doubts that this can be “fully ascertained, simply because of the huge number of animals required to demonstrate an unequivocal effect.” This tacitly assumes that the only “scientific” way to study the problem is, for example, to expose huge numbers of inbred mice to low doses of radiation. This assumption