Letters

Psychiatric Diagnoses

It was good to see the recent issue of *Science* (21 Nov.) highlighting the epidemiologic approach. It is a scientific method that has yielded data important to the health of the public and one that has not received ample coverage. Recent developments in understanding the epidemiology of psychiatric disorders could also have been included.

Over the last decade there has been considerable improvement in the specificity and reliability of psychiatric diagnoses. These efforts have yielded diagnostic approaches suitable for field surveys of psychiatric disorders. In 1980, the first effort to assess the prevalence and incidence of psychiatric disorders and associated risk factors was initiated in the United States by the National Institute of Mental Health Epidemiologic Catchment Area Program (ECA). More than 20,000 adults living in New Haven, Connecticut; St. Louis, Missouri; Baltimore, Maryland; Durham, North Carolina; or Los Angeles, California, were surveyed (*1*). The preliminary findings of the ECA study indicate that about 15% of the adult population suffers from a definable alcohol, drug, or mental disorder in a 6-month period. Alcoholism, major depression and other related affective disorders, and phobias and related anxiety disorders are most prevalent. Schizophrenia and other psychoses account for less than 1% of the 6-month prevalence. The rates of most psychiatric disorders were remarkably similar in all five sites. There is good evidence for a major increase in the rates of depression among young adults (ages 18 to 34) born after World War II (*2*). In fact the youngest populations were at greatest risk for many of the psychiatric disorders, and the elderly populations were at low risk. Less than a third of persons with psychiatric illness receive any treatment.

Also emanating from the advances in diagnostic precision in psychiatry have been a number of studies that fall into the broad category of genetic epidemiology. These are large studies of first- and second-degree biological relatives of individuals with psychiatric disorders. Data from these studies have demonstrated a familial aggregation of, for example, schizophrenia, depression, anxiety disorder, alcoholism, and personality disorders (*3*). New genetic linkage techniques are being used to study specific psychiatric disorders with multi-generational extended pedigrees.

Over the next few years, as the final details of these studies become public, they will yield more complete information on risk factors for the major mental disorders, which will have implications for the prevention and treatment of these illnesses and for a reevaluation of our understanding of their psychopathology. Knowledge of risk factors in the epidemiology of cancer and heart disease has contributed to public health programs that have had an impact on reducing mortality and morbidity. The expectation is that epidemiologic understanding of the major mental disorders will have a similar impact.

MYRNA M. WEISSMAN
Department of Psychiatry, Depression Research Unit, Yale University School of Medicine, New Haven, CT 06519

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Oil Import Fee?

In his editorial of 5 December (p. 1169), Philip H. Abelson notes that domestic oil production in the United States is declining and may decline further, but argues that "there remains a large amount of oil in place (more than 300 billion barrels)" and suggests an oil import fee to encourage domestic oil production. From any sensible policy perspective, 300 billion barrels (about 1750 quads) is not large at all; it is only 23 years' worth of current U.S. energy consumption, or only 56 years of U.S. petroleum consumption at current levels (*1*).

Abelson refers to coal as "the source of energy that could be exploited to minimize energy adversities." But global climate change from this most carbon-intensive form of energy is an important factor. An estimate of $1 as the cost per million Btu's of coal at the mine mouth does not appear to include control of the acid rain problem, or other environmental liabilities of coal.

For at least 13 years, advocates of increased energy production have been recommending increased production from the domestic sources of energy with the lowest fuel costs, irrespective of the costs of conversion, safety, or pollution control or the merits of the alternatives. After more than a decade of such exhortations, in the context of a federal energy department that has been largely sympathetic, domestic production of energy is essentially unchanged, costs are much higher, and demand for energy is significantly below what even the most vehement advocates of conservation were predicting in the early 1970s.

Analyses of least-cost solutions to the nation's energy problems have shown that energy-efficiency improvements can supply most of the need for new energy (*2*). Regions such as California, which have made conservation an active element of state policy, have experienced strong economic growth in tandem with some of the lowest rates of growth of electricity consumption and the highest growth in the contributions of cogeneration and renewable energy (*3*).

Simplistic solutions like an oil import fee will not address most of the important economic, security, and environmental issues associated with energy. Successful energy policies have relied on efficiency standards, economic incentives to conservation, rate structures reflecting more closely the true societal cost of energy, proper price signals to producers, and utility participation in improving efficiency as well as producing power. A similar comprehensive program could be the most effective way for the United States (as part of a larger global system) to accomplish simultaneously the goals of increasing economic productivity and growth, reducing pollution impacts and the effects of energy exploration on wilderness or undeveloped areas, and controlling global CO_2 emissions.

DAVID B. GOLDSTEIN
Natural Resources Defense Council, 25 Kearny Street, San Francisco, CA 94108

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3. For information on the contribution of conservation and cogeneration in California, see *The 1985 California Electricity Report* (California Energy Commission, Sacramento, 1985), pp. 17 and 53.

Abelson's editorial "Energy future" is a disturbing sign of the growing protectionist trends involving many important industrial sectors. Abelson recommends a $5- to $10-a-barrel oil import tax in order to preserve U.S. "energy security." Unfortunately, he examines the current domestic energy industry in a vacuum and does not discuss the wider implications of an oil tax on overall U.S. economic security.

Energy security is only one variable in the larger equation of overall U.S. economic security. This security is in jeopardy from the "huge deficit in international trade"

mentioned by Abelson. Moreover, the competitiveness of U.S. exports is critically dependent on their prices. Because energy is a major component in the manufacture of most U.S. exports, not only would the American oil consumer lose in the oil tax scheme but the United States would essentially be exporting its higher energy costs in the form of finished products. American competitiveness in the international marketplace would diminish, and the protectionist argument gets turned on its head. Certainly, the protectionists would not argue for a tax on U.S. exports.

TODD A. WATKINS
John F. Kennedy School of Government, Harvard University, Cambridge, MA 02138

Science Unfettered

Barry D. Greenberg's enlightening etymological explanation of "Mazel tov" (Letters, 14 Nov., p. 803) is indisputable if incomplete. The Babylonian Talmud teaches "Ayn Mazol L'Yisrael." The careless translator renders this: "The people of Israel have no luck." The careful student correctly translates: "The people of Israel have no constellation," meaning that they are not idol worshippers—not even of heavenly idols. Here then, a harbinger of science unfettered.

ELY E. PILCHIK
1025 South Orange Avenue, Short Hills, NJ 07078

Berry's Phase: Other Observations

One of the fascinations of physics is the frequent appearance of the same idea in widely divergent subdisciplines. A beautiful example is Berry's phase (Research News, 24 Oct., p. 424) with import for the quantum Hall effect, gauge theories, molecular physics, and optical physics. An unfortunate consequence of the diversity is that followers of one discipline may be unaware of closely related work in another.

Not only were the fractional pseudorotational quantum numbers associated with Berry's phase predicted by Longuet-Higgins in 1958 (*1*), but consequences of fractional quantization were observed within a few years of that prediction in experiments on color centers in alkali halides (*2, 3*). More extensive results were reported on transition metal impurities in a variety of hosts during the late 1960s and 1970s (*4*). The color center work (*2*) involved optical studies of the R center, a cluster of three F centers forming an equilateral triangle. The F center, an electron trapped by the positive charge associated with an anion vacancy in an ionic crystal, is a solid-state analog of the hydrogen atom. The R center is thus the solid-state analog of the H_3 molecule; it is amusing that Na_3, another analog of H_3, was the free molecule in which Delacrétaz *et al.* (*5*) established the fractional quantization in the experiment discussed in the Research News article.

ROBERT H. SILSBEE
Department of Physics, Cornell University, Ithaca, NY 14853-2501

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