LETTERS

Power Wheeling

George L. Weil (Letters, 1 Aug. p. 544) makes the important point that producing the "equivalent" amount of oil in the form of electricity does not necessarily mean we are solving the oil problem. He argues that "even if the 91 nuclear plants now under construction could be completed in half the time it takes today, all of these plants would not displace oil," but "that 61 plants would displace coal; 24 plants would displace either oil, coal or gas; and only six plants would displace oil." This is probably true if the plants were confined to only supplying power to the utility systems to which they belong. Expanding one's view to look at electrical generation and transmission in the United States as a whole, however, allows for a more optimistic picture.

An intelligent program of power wheeling (transfers between utility systems) could save a great deal of the 1.6 million barrels per day of oil (*1*) used in base- and intermediate-load power generation. The same could be done to replace natural gas, which is being burned for power production at a rate equivalent to 1.4 million barrels of oil per day (*1*). This is important because gas is useable in almost all applications (other than transportation) in which oil is used. The freed gas could be used to displace oil in industry and in commercial and residential space and water heating.

It would be necessary to provide power mainly to the regions of the country where much of the electricity is generated with oil or gas (California, Texas, Florida, New York, and New England) (*2*). Existing coal and nuclear plants operated at their maximum capacity factors corresponding to their availability could displace 800,000 barrels per day of oil or the equivalent of gas (*3*). If the present construction of coal and nuclear plants were accelerated, a further savings equivalent to 1.1 million barrels per day of oil or gas could be realized by 1986 (*4*). After 1986, however, the capacity would be required by the owning systems, although new plants specifically constructed to displace oil- and gas-fired units could begin to come on-line. Thus a potential exists for saving 1.9 million barrels per day of oil, which amounts to more than one-quarter of our rate of oil importation.

For such a scheme to work it would be necessary to strengthen the ties between electric utility systems and to make necessary institutional changes (in wheeling charge rules, in the way contracts between utilities are established, in the attitude of public service commissions towards interactions between states, and so forth). Already between 200,000 and 300,000 barrels of oil per day are being intentionally saved by the economical transfer of power between utilities (*5*). It is important that the United States continue to increase this amount, which will require the accelerated construction of nuclear and coal-fired plants.

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Between Disciplines

Halsey Royden's comment (Letters, 11 July, p. 216) that "some worthy proposals may experience difficulty because they fall between different disciplines or divisions of a discipline" underscores an even more sensitive range of concerns. The presumption that "science" is conducted solely within disciplines dominates establishment practices in funding research, publishing findings, and advancing careers. Unfortunately, this not only occasions cracks between disciplines, it fails to provide adequate bridges across intellectual and societal chasms. Is it surprising that many of the intellectual "breakthroughs" of the modern era—perhaps the most celebrated being the cracking of the genetic code—literally had to fight their way out of constricting disciplinary bounds? Many "frontier" developments in technology, for example, holography and chemotherapy, also fit poorly into existing disciplines. Correspondingly, it is widely recognized that few pressing societal problems mesh with disciplinary expertise in any functional fashion; energy, environment, and national security all demand cross-disciplinary collaboration (*1*).

Taken together, what emerges from these examples is a need to broaden our working definition of science. Surely the disciplines are needed as repositories of knowledge and as organizations for professional certification and identification. But interdisciplinary work must also be nurtured. Studies (*2*) of various interdisciplinary efforts highlight the institutional barriers—nowhere more imposing than in academe—to such work.

Despite its importance, the study of interdisciplinary processes per se is not adequately funded. Mission agencies rarely feel inclined to study research processes. More distressingly, the National Science Foundation seems unable to find a home within which to consider such research, having reorganized its Research Management Improvement Program out of existence.

We urge scientific institutions of all kinds—employing, funding, publishing—to offer a helping hand to cross-disciplinary projects, including research on how to conduct them. At this time of austere budgets, we fear the untimely withdrawal of support for this least institutionalized, but most vital, form of research.

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Erratum: The last sentence of the report "β-Lipotropin: A new aldosterone-stimulating factor" by H. Matsuoka *et al.* (11 July, p. 307) should have read, "These data raise the question whether β-LPH and possibly other pituitary peptides are the unknown hormones that cause bilateral adrenal hyperplasia in some types of primary aldosteronism."

Erratum: The next to last paragraph of the letter from P. Elias and D. Frisch (27 June, p. 1412) should have read, "We believe that those who feel too shy to undertake even such limited confrontations will make their most useful contribution by refusing to participate in Soviet-American scientific meetings and by including among the reasons for their refusal the oppression of a particular Soviet colleague."

Erratum: In the report by D. A. Mathers and J. L. Barker (25 July, p. 507), the sentence beginning on line 12 of the first column of p. 508 should read: "A simple interpretation of this observation is that the drug opens ion channels of similar conductance and five times the lifetime of those activated by GABA. The results do not, however, reveal the mechanism by which the drug activates the channel."

Erratum: In the report "Estrogen and the growth of breast cancer: New evidence suggests indirect action" by S. M. Shafie (8 Aug., p. 701), the following sentence was omitted from the end of the next to last paragraph: "This interpretation is consistent with that of C. Sonnenschein and A. M. Soto [*J. Natl. Cancer Inst.* **64**, 211 (1980)] suggesting that estrogen is not per se a growth promoting agent."