

ENERGY

Janet Raloff reports from Ft. Lauderdale at the International Scientific Forum on an Acceptable Nuclear Energy Future

Russians report laser fusion advance

Because he was the first to publish on the subject, Nobel laureate Nikolai Basov is considered by some to be the father of laser fusion. Forum participants listened attentively to the announcement by Basov that he and colleagues at the P. N. Lebedev Physical Institute in Moscow reached a confinement time and plasma density necessary to demonstrate breakeven laser fusion—something the United States is not yet able to claim. Basov's group lacks by a factor of more than 10, however, the temperature of 10 kiloelectron volts (roughly 10^8 degrees kelvin) necessary for fusion. U.S. experiments have achieved temperatures near those necessary to demonstrate fusion.

C. Martin Stickley, who heads the Energy Department's laser fusion program, expressed concern about whether Basov's figure of $5 \times 10^{14} \text{ cm}^{-3} \text{ sec}$ (density multiplied by confinement time) "was measured and computed in the same way as it is done in the U.S." He said that John Emmett will host Basov and colleague V. Rozonov at Lawrence Livermore Laboratory (the major U.S. laser fusion center) where they will extensively discuss recent U.S. and Soviet experiments. Emmett heads Livermore's laser fusion program. Basov would probably welcome their validation of his claim, as Livermore offers one of the best peer-review panels available.

Basov described how U.S. and Soviet programs differ in approaching the three key parameters—confinement density, time and temperature—necessary for demonstration of breakeven energy production from fusion. Breakeven requires that laser energy delivered to the target equals fusion energy output. For fusion to become a net energy producer, however, higher temperatures of around 15 keV are needed, Stickley said.

Stickley told SCIENCE NEWS that if Basov's claims prove correct, U.S. and Soviet programs "will have achieved nearly equivalent plasma conditions for releasing energy from one fusion fuel reaction."

GNP vs. energy: Take a look at Germany

Unexpected relationships appear when the world's energy use is viewed as dynamic vectors instead of as a series of fixed points, say Marjorie Meinel and Aden Meinel of the University of Arizona. The dynamic approach removes "differences in base loading induced by differences in scale and in basic energy-intensive industries," they say. By plotting many countries over the same period this way, they found that Germany alone was able to break the tie of proportionality between energy growth and GNP (gross national product). Germany shows remarkable ability to raise GNP with small increases in energy use, they say.

The widespread impression that Sweden can achieve high per capita GNP with low energy consumption is a myth, because "It takes almost as much energy to generate an increment of \$1,000 in GNP in Sweden as it does in the U.S.," they say. In fact, "With the exception of Germany, the trajectories for all countries are surprisingly similar in slope."

The Meinels also charted an 83-year history of energy and GNP in the United States. They attribute the steep rise in energy use relative to GNP from 1893 to 1917 to the invention of novel but inefficient devices to better life. And they say the decrease in energy versus GNP between world wars is due to engineering efficiencies. Finally, they say the rise in energy versus GNP between World War II and 1973 shows that energy-consuming goods were more efficient than pre-1917, but that each new efficiency was harder to get. This does not encourage "the vision of a new epoch of decreased energy use combined with steady or increased GNP," they conclude.

BEHAVIOR

Psychosurgery causing schizophrenia

In the ongoing controversy over psychosurgery (SN: 5/14/77, p. 314), critics of the procedure point to its "destructiveness" of brain tissue. But much of the criticism has been largely theoretical, and—primarily because of the unavailability of case histories—relatively few specific cases of ill effects have been cited.

Now, however, psychiatrists at the University of Tennessee at Memphis School of Medicine report "schizophrenia-like symptoms as a complication of psychosurgery." In the November AMERICAN JOURNAL OF PSYCHIATRY, Javier I. Escobar and Vijaya Chandel detail the case of a 44-year-old woman who developed schizophrenia symptoms seven months after psychosurgery for intractable depression.

Following the woman's January 1977 admission to the Memphis Mental Health Institute, Escobar and Chandel found that despite the earlier surgery, "her symptoms of depression were unchanged." They further report that despite no apparent history of schizophrenia, the woman now had additional symptoms such as hallucinations, delusions and paranoia—a combination characteristic of schizophrenia.

Citing a number of animal and human research findings, the psychiatrists conclude that the symptoms resulted from the destruction of tissue in the limbic system. (In this particular operation, the "cingulotomy," surgical lesions are made in the cingulate fibers of the limbic system.)

The woman was ultimately treated, successfully, with neuroleptic drugs, but Escobar and Chandel conclude that in this instance not only did psychosurgery fail to relieve the depression, but it "activated schizophrenia-like symptoms."

The comfort of a nurse's touch

The "bedside manner," essentially non-existent in modern American medical practice, may indeed still be beneficial to patients—at least female patients. One aspect of the technique was tested with 19 male and 29 female patients at the University of Connecticut Medical Center in Farmington, Conn.

Researchers Sheryle Whitcher and Jeffrey D. Fisher examined the effects of nurses touching patients during preoperative instruction. The results were presented recently in Washington at the annual meeting of the Psychonomic Society.

After assessing the patients' behavioral and physiological responses, as well as self-reports, Whitcher and Fisher conclude that "female patients in touch conditions experienced lower presurgical anxiety, less worry concerning complications, rated hospitalization as less unpleasant and responded more favorably on physiological dimensions than female controls" who were not touched. However, males' responses were "ambivalent, with touch males reporting more fear of surgery than control males," they report.

Homeliness and mental illness

It has been noted that Americans are preoccupied with good looks, rendering the less physically attractive members of society a handicap that may be psychologically as devastating as any disease. In the October JOURNAL OF ABNORMAL PSYCHIATRY, researchers at the University of Connecticut and Connecticut Valley State Hospital report the results of two studies of 73 patients and controls which indicate that homeliness can contribute not only to mental disorder, but to increases in length of hospitalization and decreases in visits from family and friends.

"The mentally ill as a group [are] less attractive than controls," conclude the researchers, "[and] the social consequences of an unattractive appearance for patients (as for people in general) are negative."