

stretched into the early morning hours, the Americans found themselves allied with Africans and Latin Americans—in opposition to Japan and Western European nations, most notably Britain and the Netherlands, both with major fur-processing industries.

Economic considerations were doubtless an important factor in the conservative Japanese and European positions. (Britain, for example, is widely believed to process a large portion of fur seal hides taken legally and illegally in the Atlantic.) But at least among the Europeans, the practical difficulties of enforcing major new customs regulations were also a source of concern. As one British delegate observed privately, "It is the American style to clobber a problem with a law that is not enforceable, and then to try enforcing it as best they can. In Britain, unenforceable law is considered bad law."

In the end, U.S. officials were plainly elated at the conference's outcome. As

one biologist advising the U.S. delegation put it simply, "We won." Assistant Secretary Reed, while conceding that fur smuggling would surely continue, said he was confident that it would never again reach the scale of the Vesely-Forte ring.

Nevertheless, the practical value of the endangered species convention depends largely on the good faith of the signatory nations and thus remains to be proved. For one thing, each nation must still ratify the agreement, and most will have to enact new legislation to enforce it. (Neither ratification by the U.S. Senate nor amendment of the Endangered Species Act appears to pose any problems, however.)

Moreover, a number of U.S. officials fear that, in the year or more the convention will take to come fully into force, poachers the world over may engage in one last, potentially catastrophic slaughter of wildlife. A grandfather clause in the convention exempt-

ing hides stockpiled before the convention takes effect could encourage such a slaughter, Russell Train, the chairman of the President's Council on Environmental Quality, warned the closing session of the conference.

It is also possible that some countries may decide to abstain from protecting specific animals while adhering to the rest of the agreement. The French leather industry, for just one example, is expected to apply considerable pressure to President Pompidou's government to ignore the convention's ban on trade in most crocodilians.

Above and beyond all this, those who drafted the agreement were well aware that destruction of wild habitat, and trade within nations, play at least as great a role in the decline of rare species as trade among nations. Even so, the convention stands as an important, possibly historic achievement—on paper, if not yet in the wild.

—ROBERT GILLETTE

Psychosurgery: Legitimate Therapy or Laundered Lobotomy?

The controversy over what some call the "new wave" of psychosurgery has been gaining momentum over the past year. It has rushed into a realm where data are scanty and unreliable, and where there are few legal, medical, or ethical guideposts. Neither the government nor the medical profession has established standards for the selection and treatment of psychosurgery patients, and some people think the way is clear for a new lobotomy boom like that which occurred in the 1940's and early 1950's.

One measure of the visibility of the problem is that Senator Edward Kennedy (D-Mass.) recently devoted a morning to hearings on the subject in connection with a bill he plans to introduce on medical experimentation with human beings.

If any single individual is responsible for getting the issue out in the open, it is Peter Breggin, a Washington psychiatrist who writes "brave new world"

novels about psychosurgery. Breggin opposes any and all psychosurgery on the grounds that the operations have a general blunting effect on emotions and thought processes and that there is no theoretical or empirical justification for any of them.

This argument presupposes general agreement on a precise definition of "psychosurgery," but no such agreement exists. Grossly speaking it can be defined as the destruction or removal of brain tissue for the purpose of altering certain behavior. There are many kinds of procedures—what has aroused most concern is the fact that some surgeons are doing brain surgery on subjects prone to habitual violence. Critics think this is only a step away from using psychosurgery or the threat of it as a tool for social control.

The antipsychosurgery factions see little difference between current procedures and the old prefrontal lobotomies, of which about 50,000 were per-

formed for disorders ranging across the spectrum of mental illness and brain disease. Lobotomies reduced the populations of mental hospitals. They also left an indeterminate number of semi-vegetables in their wake.

It was not the medical profession that called a halt to these operations. Rather, it was the development of a new family of tranquilizing drugs called phenothiazines. But as it became evident that there are some people whose condition intensive drug therapy can't alleviate, psychosurgery began a tentative comeback, this time in a far more refined form. The lobotomy has been abandoned in favor of interventions in various parts of the limbic system—the portion of the brain that rules the higher functions of emotion, self-awareness, and creativity. Stereotaxic surgical procedures, which enable electrodes to be inserted and directed to any part of the brain, have made operations highly selective. The trouble is, there is still no conclusive evidence correlating specific brain structures with specific behavior.

At present, probably no more than 500 psychosurgery operations per year are being performed in this country, by perhaps a dozen neurosurgeons. Nonetheless, the new ways scientists are finding to tamper with the nature of life itself, combined with the social aware-

ness born of the political upheavals of the 1960's, have produced a considerably higher level of sensitivity than that which governed brain surgery two decades ago.

The controversy centers upon brain operations to control violent behavior allegedly associated with epilepsy, and criticism has been focused on a trio of doctors associated with Harvard University: William Sweet, chief of neurosurgery at Massachusetts General Hospital; Vernon Mark, neurosurgery chief at Boston City Hospital; and Frank Ervin, a psychiatrist and neurologist who is now on the faculty of the University of California at Los Angeles and associated with the newly formed Center for the Prevention of Violence there.

In 1967, these three wrote the *Journal of the American Medical Association* a letter that has now become a staple exhibit among the opponents of psychosurgery. The letter suggested that, while environmental and social factors undoubtedly played a role in the urban riots that were then raging through the country's metropolitan centers, another factor was being ignored: namely, the possible role played by brain disease—"focal lesions" that spur "senseless" assaultive and destructive behavior. There is a need, said the letter, for research and clinical studies to "pinpoint, diagnose, and treat those people with low violence thresholds before they contribute to further tragedies."

Around the same time, the group set up a Neuro Research Foundation at Boston City Hospital to carry out the appropriate studies and identify possible subjects for brain surgery. In 1970, through various mysterious maneuvers that no one seems to be able to explain, they persuaded Congress to direct the National Institute of Mental Health (NIMH) to award them a \$500,000 grant to carry on their work. Louis Wienkowski, director of NIMH extramural research, says NIMH was not prepared to support such activity and tried to fulfill congressional intent by using the money for animal studies. But the funds eventually found their way to the Sweet group in the form of a closely monitored contract, with the stipulation that no brain operations on human beings be performed. While Sweet's work was regarded with apprehension by the medical community, the law enforcement community has shown more enthusiasm: at about the same time, the foundation obtained a grant of \$108,000 from the Law Enforcement Assist-

ance Administration of the Justice Department to test procedures for screening habitually violent male penitentiary inmates for brain damage.

Congressional interest, too, remained alive last year. The Senate Labor-Health, Education, and Welfare appropriations subcommittee, headed by Warren Magnuson (D-Wash.), was so impressed with Sweet's testimony on the need to investigate the relationship between violence and brain disease that they stuck a \$1 million line item in the budget of the National Institute for Neurological Diseases and Stroke (NINDS) to be applied to research in this area. The appropriation was killed when President Nixon vetoed the Labor-HEW bill last September, and its resurrection is unlikely.

Murray Goldstein of NINDS says Congress did not earmark the funds for Sweet's work in particular and that the money would not have been used to support experimental surgery on human beings in any case. Nonetheless, the issue of the \$1 million has mobilized protests from a number of government scientists and mental health professionals. Calling themselves the NIMH-NINDS Ad Hoc Committee on Psychosurgery, they have circulated petitions opposing the appropriation. "Since psychosurgery can severely impair a person's intellectual and emotional capacities, the prospects for repression and social control are disturbing," says the petition.

Polarization

As this wording indicates, the public controversy has picked up the whole range of procedures that fit into the category of psychosurgery and placed them firmly in the political realm—with those at the extreme ends of the debate, such as Breggin and a University of Mississippi neurosurgeon named O. J. Andy, doing most of the talking.

Staging a Breggin-Andy confrontation seems to be the currently popular way of trying to cast light on the psychosurgery question. (Most recently, these two were key witnesses at the Kennedy hearings.) Breggin, who has been labeled a "fanatic" by at least one respectable neuroscientist, flatly opposes any intervention in the brain for the purpose of altering behavior. Psychosurgery is an "abortion of the brain" and is being used to repress and vegetabilize the helpless: the poor, the women, the black, the imprisoned, and the institutionalized. Andy has allowed himself to be made something of a

scapegoat by critics of psychosurgery. He operates on institutionalized individuals whom, he says, "everyone else has found hopeless." Many are wards of the state; most are children. His motives have not been impugned, but his methods of diagnosis, patient selection, and follow-up—"casual to the point of irresponsibility," as psychiatrist Willard Gaylin of the Hastings Institute has called them—as well as his limited sensitivity to the ethical issues involved, make him a handy target.

Another highly vocal commentator is David Eaton, an influential Washington, D.C., minister who states flatly that, if somebody doesn't do something, psychosurgery will be used to repress blacks, if it isn't already. A recent article in *Ebony* carried the same message and was entitled, "New threat to blacks: Brain surgery to control behavior."

It is not difficult to understand the concern among blacks and other relatively powerless groups about a procedure that is hedged by virtually no legal safeguards. For example, Santa Monica neurosurgeon M. Hunter Brown is quoted as saying he did 20 operations on people who came to him as a result of an article in the *National Enquirer*, a human interest tabloid in which Brown tells how, with thermal probes, he can turn "vicious killers" into "happy peaceful citizens."

The issue has become highly confused, partly because discussions of psychosurgery fail to differentiate among various procedures and the purposes for which they are used. The cingulotomy is probably the most prevalent kind of operation, according to Paul Fedio of NINDS. This is not performed for violence-associated disorders and is probably psychosurgery in its purest form because it is done for behavioral disorders in persons with no apparent brain pathology. H. T. Ballantine of Massachusetts General Hospital is probably the most prolific cingulotomist, and he does it for alleviation of intractable pain as well as for various "neuropsychiatric illnesses" such as depression, anxiety states, and obsessional neuroses that have not proved amenable to other kinds of treatment.

Then there is the thalamotomy, which was used in the past to curb the psychomotor effects of Parkinson's disease, and has since been replaced by the drug L-dopa. Thalamotomies are still in the running, though, with O. J. Andy using this procedure for persons suffering from "hyper-responsive syndrome," a

vaguely defined disorder marked by violence and total unmanageability. Andy says all his patients suffer from "structural pathology" of the brain.

Finally (for the purpose of this article), there is the amygdalotomy. Fedio says this procedure was originally developed to curb epilepsy. Sweet and his colleagues are extending this procedure to people with diagnosable brain damage—who suffer outbursts of uncontrollable violence, but who do not necessarily have epilepsy. One problem is that the connection between violence and epilepsy is extremely murky. Furthermore, says Fedio, there is no concrete evidence that an individual's violent be-

havior is associated with the specific damage that has been located in his brain.

Many neuroscientists who believe some forms of psychosurgery are beneficial have heavy reservations about intervention to alleviate violence.

But since no one seems to know what to do about it, it looks as though some decisions are about to be made willy-nilly by the courts. One such case, apparently the first of its kind, is scheduled to be decided soon by a court in Detroit. It all began with a proposal by two doctors associated with the Lafayette Clinic, the psychiatric teaching hospital of Wayne State University. The

doctors, Jacques S. Gottlieb and Ernst A. Rodin, put together 3 years ago a "Proposal for the Study of the Treatment of Uncontrollable Aggression at Lafayette Clinic." The Michigan legislature subsequently appropriated \$228,400 for the research project, which was designed to compare the use of amygdalotomy and drug therapy on two comparable groups of patients. The subjects were all to be nonpsychotic, brain damaged males (because females have "more diffuse brain diseases") over 25, with I.Q.'s over 80, hospitalized for at least 5 years, who had been subjected unsuccessfully to all other known forms of treatment, who re-

Briefing

"Free Speech" Figure Wins Compensation

Berkeley physicist Charles Schwartz, who was suspended from a summer research job at the Lawrence Berkeley Laboratory (LBL) as a result of a "free speech" dispute in 1970, has won a court decision awarding him compensation for lost income. The Alameda County superior court judge's key finding was that "The evidence preponderates that the petitioner's status was changed with the consequent loss of salary because of his constitutionally protected political activities."

The decision covers the summers of 1970, 1971, and 1972. Schwartz was suspended briefly in the summer of 1970 by LBL director Edwin M. MacMillan (*Science*, 21 August 1970). The immediate cause of that suspension was two noon-hour seminars organized by Schwartz dealing with the interactions of science and politics. MacMillan determined that the seminars were held contrary to existing LBL policy, which limited such meetings at the Atomic Energy Commission supported laboratory to the discussion of technical matters.

Schwartz was originally suspended for 2 weeks and then finished out the summer at LBL. In 1971 and 1972 he was refused summer employment. A theoretical physicist, Schwartz is a member of the physics department at the University of California, Berkeley, with the rank of professor. After the suspension, he began a series of ap-

peals using the grievance procedures of the lab and the university, including the university's committee on academic freedom and the committee on privilege and tenure. The suspension was reduced to 2 days, and the lab's free-speech policy was criticized, but MacMillan's right to take the action was upheld. In September 1971, as a result of a new LBL committee report, the lab's policy on meetings was liberalized along lines advocated by Schwartz and others.

Last March, when Schwartz was refused summer employment, the American Federation of Teachers agreed to act in Schwartz's behalf in a suit charging that he had been fired for political activities protected by the Constitution.

Schwartz throughout has argued his side in a series of statements and press releases. In a representative statement issued after the court decision on 20 February, he said that, in addition to defending the principle of free speech, "I have been a spokesman for the politically radical views, seeing that the fruits of modern science and technology are too often being used in ways that are harmful rather than helpful for human society. I have been particularly critical of those institutions and those leaders of the scientific establishment that have been eager servants of militarism. For this outspokenness, the establishment acting through the Lawrence Laboratory, sought to shut me up by shutting me out."

The 20 February court decision leaves some things unclear. The final judgment on compensation will be

made after a further finding of fact. This could amount to \$10,000 according to Schwartz, but the decision specifies Schwartz is entitled to salary claimed "less any sums earned in mitigation of damages or which reasonably could have been earned." It is also possible that the lab will appeal the judgment.

Schwartz says the decision means that he has been "reinstated," but the judge noted that "This decision should not be construed as affecting future summer job placement opportunities for petitioner which may be dictated by budgetary considerations."

Schwartz has disputed the fairness of his removal from a list of "regular" summer employees, but a series of budget cuts at LBL could make the argument academic. Until a few years ago, university physics faculty at Berkeley could count almost automatically on summer employment at the lab. Employment at the lab declined from 2975 full-time equivalent employees in 1966, to 2545 in 1970, to 2110 as of 1 February. Another 200 jobs are to be phased out over the next 8 months as a result of general cutbacks by the AEC. Lab policy now requires that summer employees be engaged in substantial and continuing work at the lab throughout the year.

Schwartz says that at this point he has not decided whether he will apply for summer work at LBL. And lab officials, who say they are reluctant to comment while the case is still not finally settled, will say only that at present Schwartz has "no status" at LBL.—J.W.

NEWS & NOTES

● HUMANITIES APPROPRIATIONS:

President Nixon requested \$72.5 million in appropriations for the National Endowment for the Humanities and an equal amount for the arts endowment for fiscal 1974. This sum nearly doubles the amount requested for the humanities endowment for fiscal 1973, which was \$39 million. Most of the \$72.5 million (\$65 million) is for supporting ongoing programs and starting new ones, and the remaining \$7.5 million is for matching private donations to the endowment. A portion of the appropriations will be earmarked for bicentennial programs, but how much is undetermined until Congress acts on the appropriations request.

● LIMITS TO GROWTH OR NO?:

The Department of Health, Education, and Welfare has issued a two-part study on possible government action in response to *The Limits to Growth* (*Science*, 10 March 1972). The study, initiated by Elliot L. Richardson, then Secretary of HEW, was done to determine the possibility of assessing whether the quality of life is improving, how changes in one area relate to changes in another, and the effect of government programs on the quality of life. "The Implications for Government Action of *The Limits to Growth*," written by Walton J. Francis, a program analyst in HEW's Office of Planning and Evaluation, concludes that there is no immediate prospect of a breakthrough in measuring the quality of life and that there is no need for drastic government action to curtail growth to prevent ecological catastrophe. Richardson called the papers "tentative and exploratory," and HEW acknowledged that they do not present an official HEW position and are being circulated for discussion purposes. The study is available from the HEW Office of Public Affairs, Room 5541, North Building, 330 Independence Avenue, SW, Washington, D.C. 20201.

● **R & D FORECAST:** The annual R & D forecast of the Battelle Columbus Laboratories predicts that research and development expenditures in the United States will reach \$30.1 billion in 1973. American industry, which performs about 69 percent of all research, is cited as the fastest growing source of R & D support.

membered their violent acts and felt remorse about them, and who were capable of understanding and deciding whether they wanted to undergo the treatment.

The first subject chosen was a 36-year-old man, known as a criminal sexual psychopath, who had been in Ionia State Hospital for 18 years since he murdered and raped a nurse (in that order). The subject and his parents have both signed the consent form, and he is said to be very eager to have the operation, although he was fully informed of possible undesirable side-effects, including death. With the concurrence of two committees, one to review candidate selection, the other to guard the patient's interests, the operation was scheduled for 15 January.

Then Gabe Kaimowitz, a Michigan Legal Services lawyer and member of the Medical Committee for Human Rights, found out about it, and the matter blew up in the press. Kaimowitz asked for court review of the matter, claiming that the patient is being detained under a now-obsolete law, that the circumstances (the subject wants the operation so he can get out) make informed consent impossible, and that the use of public funds for the project is inappropriate.

One likely outcome of the case—to be decided by a three-judge panel of the Wayne County Circuit Court—could be a ruling that this type of surgery should not be performed on involuntarily institutionalized patients. It has focused a good deal of public attention on the matter and has drawn the attention of public interest groups, including Washington's Center for Law and Social Policy. "The case will establish an important precedent for efforts to impose social control on the uses of psychosurgery," says Charles Halpern of the center.

"Psychosurgery," says Ayub K. Ommaya of NINDS, "is a failure of medicine." Far more research needs to be done before guidelines for its appropriate use can be formulated. On the other hand, he points out, there are rare instances—intractable pain or *anorexia nervosa* (self-induced starvation), for example—where a brain operation appears to be the only answer.

There now appears to be a gradually coagulating body of "responsible opinion." One possible move, proposed at the symposium on behavior control at the last AAAS meeting, would be for the government to establish regulations

that would surround the use of an experimental surgical procedure with the same kind of safeguards the Food and Drug Administration applies to new pharmaceutical procedures. Protocols might be set up to govern the selection of patients—requiring the approval of various review committees, assuring that all alternatives have been exhausted, and defining "informed consent." The last is particularly difficult, for, as Gaylin says, "The damaged organ is the organ of consent."

Operations on institutionalized individuals might be banned, as might surgery for controlling violence, because of the political implications and the rudimentary state of knowledge about the connection between violence and brain disease.

So far, professional organizations such as the American Medical Association have had little to say. Exceptions are the American Orthopsychiatric Association, which is filing an *amicus curiae* brief in the Detroit case, and the Society for Neuroscience, which has made psychosurgery its theme for the year.

The federal health establishment is taking an increasingly visible interest in the questions surrounding psychosurgery. Bertram Brown, director of NIMH, made the strongest public declaration by a high government official to date when he said at the Kennedy hearings that he believes there is not enough known about the brain to supply clear justification for such operations. Meanwhile, NIMH and NINDS have set up an "inter-institute work group" to define problems surrounding psychosurgery and make recommendations, due next June, on future priorities in brain research.

A lot of defining needs to be done. Broadly speaking, "psychosurgery" could include electroshock therapy, prolonged drug therapy, and the insertion of electrodes for diagnostic purposes, since all of these can make permanent alterations in brain tissue.

Some people think the psychosurgery issue is getting more attention than it deserves. It is really at the extreme end of a massive spectrum of increasingly sophisticated ways people are learning to manipulate each other. But as such, it may spur people to find ways of assessing how new behavioral technologies encroach on individual freedom and to decide on the extent to which they are desirable.—CONSTANCE HOLDEN