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Law and the Physical Control of The Mind: Experimentation In Psychosurgery

*Edward A. Mearns, Jr.**

Scientific advances have led to the increased use of psychosurgical techniques. The author discusses the threat posed to the individual and society by the direction of current research and considers the potential for widespread control of men's minds. Nevertheless, the author concludes that the greatest danger of psychosurgery is not that it may be used to "psychocivilize" society. Rather, the present trend is more significant as a symbol of societal indifference to more subtle methods of shaping behavior, which in turn create a society tolerant of psychosurgery.

I. INTRODUCTION

MEDICAL SCIENCE and technology have made advances in recent years that we must marvel at. Popular magazines with their understandable interest in dramatizing scientific achievements have not been excessive in their reporting on the progress in medical technology. The fictional accounts of behavior control in *We*, *Brave New World*, 1984, and more recently in *A Clockwork Orange* and *The Terminal Man* are no longer flights of fancy (if they ever were).¹ Rather they describe the risks society may well encounter as a result of the experimentation presently being conducted in the field of psychosurgery. What can already be done by way of physically controlling the mind should be enough to excite everyone and unnerve many.

Most of us recognize that our schools, mass media, and government exert considerable influence over our behavior, their instruments being television and the printed word. Our very familiarity with education, advertising, and propaganda makes us insensitive to

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1. E. ZAMIATIN, *WE* (1924); A. HUXLEY, *BRAVE NEW WORLD* (1932); G. ORWELL, 1984 (1949); A. BURGESS, *A CLOCKWORK ORANGE* (1962); M. CRICHTON, *THE TERMINAL MAN* (1972).

this kind of control and its social implications.² We are also growing more familiar with psychotherapy and drugs as means to control those whose discomforting behavior results from mental illness or serious personality disorder. However, we do not yet appreciate that experimentation in psychosurgery has been rapidly augmenting the power to control the minds of men by physical means.

Availability of recently developed neurosurgical techniques accounts for much of this growth in power. New stereotaxic procedures provide better tools for the diagnosis and possible treatment of brain disorders.³ Guided by three-dimensional X-ray maps of the brain, electrodes can be positioned to induce electrical stimulation of specific brain sites. The stimulation may induce physical movements, manufacture aggression or pleasure, alter social relationships, change sexual behavior, and influence memory, emotions and the thinking process itself. Significantly, electrical stimulation can be accomplished by using stimoceivers, miniature, radio-like devices that already have been implanted in human brains. Being wireless, they can achieve physical control of the mind on a continuing and remote basis.

These new techniques and instruments greatly increase our capacity to experiment in behavior control, as well as to treat behavior problems. In the area where neurosurgery and psychiatry overlap, these techniques are employed by research physicians who are motivated by the desire to add to science's understanding of the nature and functions of the brain. Some of these researchers see in electrical brain stimulation a cure for individuals suffering an inability to control their aggressive impulses, who as a consequence perform tragic acts of violence. Other researchers see the new techniques as a means to reduce violence in society; that is, they see brain stimulation as a medical solution to an important social problem.⁴ Still others include in their goals man's taking a hand in his own evolution, his making decisions about the future nature of the species, and his consciously shaping our violent society to make it "psycho-civilized."⁵

Whatever the goals, electrical stimulation of the brain has added

2. J. ELLUL, PROPAGANDA (1965).

3. See note 11 *infra* and accompanying text.

4. See V. MARK & F. ERVIN, VIOLENCE AND THE BRAIN (1970) [hereinafter cited as MARK & ERVIN].

5. See J. DELGADO, PHYSICAL CONTROL OF THE MIND: TOWARD A PSYCHOCIVILIZED SOCIETY (1969) [hereinafter cited as DELGADO].

to our potential for curing violent behavior either in a sick individual or a sick society. However, the increased power it gives some men over others raises classic problems for the legal order, problems that relate to both the interests of the human subjects of psychosurgical experimentation and the interests of those who will live in the future society. The form these problems take and how we might best deal with them are the chief concerns of this paper. The first section that follows describes the nature of current experimental activity in psychosurgery; the second identifies the elements in the calculus of risk in psychosurgery; the third evaluates the controls available to protect society and the human subjects of this experimental activity; and the concluding section reflects on the broader meaning of the scientific efforts to enhance our power of physical control over men's minds.

II. EXPERIMENTAL ACTIVITY IN PSYCHOSURGERY

A. *The Nature of Psychosurgery*

At this stage in the history of medical science, we know a great deal concerning the physical structures and the electrical and chemical events occurring in the brain. We also know much about human personality, behavior, and mental and emotional states. However, we remain quite ignorant about how these physical conditions and activities relate to the mental conditions and behavior with which they appear to be associated. In light of our relative ignorance of the nature of the relationship between the physical and mental, any surgical intervention in the brain to alter mental condition or behavior necessarily confronts a high degree of uncertainty as to its results. Therefore, it is characteristic of all psychosurgery, as it will be defined here, that it is experimental surgery. This is so whether its purpose in any particular case is to cure mental illness in a suffering individual or to increase our understanding of brain function or both.

Psychosurgery is the surgical removal or destruction of brain tissue or the cutting of brain tissue to disconnect one part of the brain from the other, performed with the purpose of altering behavior or mental condition when there is no direct evidence of either structural damage in the brain or organic brain disease.⁶ The two key

6. B. BROWN, L. WIENCHOWSKI & L. BROWN, PSYCHOSURGERY: PERSPECTIVE ON A CURRENT ISSUE 1 (U.S. Dep't of Health, Education, and Welfare Pub. No. [HSMHA] 73-9119, 1973). The extensive portion of this article de-

elements in this definition are the presence of a purpose to alter behavior and the absence of evidence of a brain dysfunction that is organic in nature. Before the importance of these elements can be fully understood, some discussion of mental illness and the abnormal behavior associated with it seems appropriate.

The assumption on which neurosurgeons perform any operation to alter behavior is that behavior, both normal and abnormal, is produced by physical events taking place in the brain. It is, of course, abnormal conduct that disturbs these surgeons, conduct such as aggression, hyperkinetic activity in children, drug and alcohol addiction, sexual deviance, and other kinds of deviant behavior. Some surgeons would also use psychosurgery to treat mental illnesses like schizophrenia and severe depression. However, most of this article concerns violence or aggressive behavior, for currently it is the uncontrollably violent patient who is the likely candidate for psychosurgery. It is the violent patient who disrupts the lives of family, friends, and prison and hospital staffs. His potential for harming himself and others invites drastic psychosurgical treatment.

The mental illnesses and brain disorders that are associated with violent behavior may be classified as either functional or organic. The functional brain disorders include the psychoses, psychoneuroses, and the serious character disorders. When the brain functions abnormally although possessed of apparently normal structures and tissue, the disorder is considered functional. On the other hand, violent behavior can be associated with organic brain disorders which are characterized by structural brain damage or disease. The organic disorders typically result from head injuries, viral infections, tumors, or oxygen insufficiency. Any surgical effort aimed primarily at the removal or repair of damaged brain tissue should not be considered psychosurgery.

In classifying brain dysfunction, there are gray areas that deserve special attention. One important one is epilepsy. Strictly speaking, epilepsy is not a disease but rather the major symptom of a brain dysfunction or disorganization of the brain. The evidence of this disorganization inside the brain consists of abnormal electrical discharge in the inner portions of the temporal lobes and eccentric brain wave patterns recorded on electroencephalographs. Epilepsy is characterized by seizures occurring both during and between the periods

scribing "Experimental Activity in Psychosurgery" draws heavily from Brown's excellent introduction to the general issues involved in psychosurgery.

of abnormal electrical activity. Most epileptics do not exhibit uncontrollably violent conduct. However, some do and this attracts the attention of psychosurgeons. The theory is that when violent behavior takes place some kind of seizure-like activity occurs in the deep limbic brain structures that control aggression and emotional behavior.⁷ Many patients have both epileptic seizures and violent episodes. There is doubtless a relationship between these seizures and the violent episodes, but it remains quite unclear what that relationship is. There is hope on the part of psychosurgeons that research with violent epileptics will produce a general model for aggressive behavior and its surgical treatment as well.⁸

In the years from 1935 through the mid-1950's, psychosurgery meant lobotomy, a treatment some have called "the therapy of desperation."⁹ Although the popular view that lobotomy reduced all its patients to "vegetables" was a misconception, there were often enough serious losses in intelligence function and marked changes in personality as a consequence of the treatment. These consequences resulted from the removal or destruction of relatively large masses of brain tissue or the severing of many subcortical connections between the frontal lobes and the remainder of the brain. There were many individual cases where neurosurgeons reported beneficial results. But no sound study of the general practice has suggested that the classic lobotomy, with its imprecise methods and unpredictable, adverse side effects, was on balance a worthwhile procedure.¹⁰

Lobotomies decreased in the early 1950's, not because of any heightened ethical sensitivity but rather due to the advent of tranquilizers. Less drastic and more effective chemical therapy, employing tranquilizers, anti-convulsants, and psychoenergizers, replaced psychosurgery as a principal treatment for serious mental illness and psychotic behavior.

Psychosurgery, in its newer form, appears to be on the upswing. This may reflect shattered hopes, hopes elevated by exaggerated early claims as to the effectiveness of the new drugs. Most likely the upswing is due to two other factors: the progress made in understanding the relationship between the functioning of specific parts of the brain and particular behavior, and the development and improvement in stereotaxic surgical techniques.

7. *Id.* at 6.

8. *Id.*

9. *Id.* at 2.

10. For a listing of lobotomy studies see *id.* at 2.

B. *New Knowledge and New Techniques*

Over the past two decades, extensive studies of monkeys, cats, and other laboratory animals have been conducted. These have involved the permanent implanting of electrodes in localized areas of the unanesthetized brain so these areas could be stimulated and behavior during stimulation noted. They also involved the destruction of these localized areas so that the behavior before and after destruction could be noted and compared. What emerges is a complicated picture of the functions of the deep structures of the brain, particularly those of the limbic system that are involved in producing and inhibiting emotional and violent behavior. Otherwise happy animals have been induced by electric stimulation to mount well-organized attacks on other animals, investigators, and inanimate objects. In other experiments, stimulation has caused animals in the midst of attacks to become docile and cease their attacks.

Similar studies of the unanesthetized brain in human subjects have added to our knowledge of brain activity and related mental states and behavior. For the most part these studies on humans have focused on the consequences of surgery that was necessary to treat organic injury or disease. Surgery to remove a tumor would be an example. These studies reinforce the notion that behavioral problems are related to pathological physical processes in the brain.

During the same period, stereotaxic surgical techniques developed rapidly as neurosurgeons sought ways to minimize the amount of destruction of brain tissue necessitated by prevailing methods of surgery. Stereotaxy, by using three-dimensional geometric coordinates and X-ray inspection, makes possible the surgical positioning of small electrodes in more or less precise locations in the brain. The electrodes carry a weak current to the tissue sites to be stimulated. If a particular site is to be destroyed, a stronger current is conducted along the wires heating their tips or leads thereby ablating the tissue surrounding them. These wires can also be used to record deep focalized electrical activity. With the development of stereotaxic techniques, the small areas deep in the brain, those associated with violent conduct, have become accessible to destruction without the massive removal of tissue required by lobotomy.

It is an important characteristic of current technique that the implanted wires can be left in the brain for extended periods. The brain, a sensitive organ in registering pain in other parts of the body, is itself relatively insensitive. Wires implanted for several years have apparently been tolerated without great difficulty or discomfort.

This tolerance and insensitivity permits exploration of the functioning mind in an unanesthetized brain. Continuing electrical stimulation and recording of electrical activity improves observation and diagnosis of brain disorder. And, with more lengthy observation, decisions to ablate diseased tissue can be made with more confidence. However, the capacity to extend the period of observation and experimentation which significantly increases the likelihood of acquiring new knowledge also increases the risk of harm to human subjects and society.

The technological society's "triumph" in this area of research has been the development of the stimoceiver.¹¹ This minute, transistorized device equips free-moving animals and humans for radio reception and transmission of electrical signals to and from their brains. The stimoceiver is in fact two instruments: one, a small capsule attached to the patient; the other, an external, usually stationary, stimulating and recording device. The capsule, fitted to the implanted electrodes in the patient's head, contains both (a) a receiver to detect radio signals and turn them into ordinary current to stimulate the brain and (b) a recorder-transmitter to gather and radio information about the electrical activity occurring near the tips of the depth electrodes. The capsules are multichannel instruments capable of transmitting signals to and from several brain sites over ranges of a few hundred feet. The stationary device, set at a distance from the patient, contains the necessary sending, receiving, and recording equipment.

Various elaborations on this system for remote electrical stimulation of the brain exist. The stimoceiver capsule can be permanently implanted and completely covered by the patient's skin. This allows transdermal communication for receiving stimulation signals and for sending information to be recorded by an electroencephalograph. The other or external portion of the system can be human-operated or linked to a computer to program the sending or receiving of electrical signals. Although usually a stationary piece of equipment, the external piece can be reduced to a portable package of radio equipment for control by either the investigator or the patient himself.

Before the development of the stimoceiver, the patient with chronically implanted wires was required to have these wires plugged and connected to nearby recording and stimulating instruments.

11. For a general discussion of the use of the stimoceiver see DELGADO 90-96.

This limited investigation to experiments staged as interviews in laboratory surroundings, rather than in unrestricted, less artificial settings. The stimoceiver, this important advance in biomedical technology, has made it possible to stimulate the brain of an unaware subject from a remote distance on a continuing basis. It also represents a major step toward the achievement of remote, continuing, physical control of the mind.

III. THE CALCULUS OF RISK IN PSYCHOSURGERY

The development of the stimoceiver, the advent of new surgical techniques, and the growth of our knowledge about the workings of the conscious brain reflect significant progress in biomedicine—progress that has influenced the psychosurgeon in important respects. It has heightened his sense of obligation and raised his hopes. Moreover, this combination of obligation and hope has impelled him to increase his experimental activity. For the psychosurgeon has obligations both as physician and scientist. As physician, he is obliged to seek new cures for the suffering patient traditional therapy has failed. As scientist, he is obliged to engage in research that might add to our understanding of the human mind and behavior.

Classified according to the nature of their hopes, psychosurgeons fall into three broad categories: (1) healers who hope to alleviate the suffering of individuals with serious mental illnesses and personality disorders; (2) those who hope to cure the ills that beset a suffering society, ills such as violence, alcoholism, drug addiction, and deviant behavior; and (3) planners who hope that man can create a psychocivilized society taking a hand in his own evolution.

In these same classifications, one can see the risks to society—both present and future—that parallel these hopes. The risks are (1) to the human subjects of experimental brain surgery; (2) to our present society, should medical men and institutions become instruments of social control; and (3) to a future psychocivilized society in which individual freedom may diminish as control of mind increases. It is necessary to examine the elements of risk inherent in experimental brain stimulation before considering the question—What legal or social mechanisms should control this experimental process?

A. *Julia*

We should begin with a picture of the sort of persons who become subjects of psychosurgery experiments. The patients are typically

very sick. They are never healthy volunteers of the kind who might be used as controls in other kinds of human experimentation. The case history of Julia illustrates this. It is taken from a book titled *Violence and the Brain* written by Doctors Vernon H. Mark and Frank R. Ervin.¹²

Julia was a pleasant, attractive, 21-year-old who had made a dozen serious, unprovoked assaults on various persons. She had frequent temper tantrums, severe psychotic episodes, and had attempted suicide on four occasions. Her medical troubles had begun before she was 2 when she had had the mumps followed by a severe attack of encephalitis. Since the age of 10 she had suffered epileptic seizures. Often, following her seizures, she would be overcome by panic and would race off without thought of where she was going. After committing several violent assaults, including the stabbing of a girl in a movie theatre and the stabbing of a nurse in a mental hospital with a pair of scissors, Julia was admitted to a Boston hospital for clinical evaluation. Prior to her admission, she had been treated extensively with psychotherapy, a variety of drugs, and electroshock without apparent reduction of her epileptic seizures or change in her pattern of violent behavior.

Electrodes were implanted in both the right and left temporal lobes of her brain. By stimulating these areas, her physicians were able to produce symptoms characteristic of the beginning of her seizures. A decision was made to make a destructive lesion in her left temporal lobe and all electrodes were withdrawn. Her symptoms persisted. She was readmitted and scheduled for a second operation. By the time of this operation, a stimociever had become available and this was attached to electrodes implanted in her right temporal lobe. From over 100 feet away, while Julia moved freely around her room, the physicians, using a radio signal, stimulated her right temporal lobe. This elicited sudden, full-blown rage reactions during which she would attack the wall of her room or a nearby person. Abnormal electrical activity was also recorded immediately prior to other rage attacks that had not been caused by stimulation. Julia was not warned in advance when stimulation was to occur. Also she was not aware during the procedures that electrical stimulation was evoking her rage responses. Another destructive lesion was made, this time in her right temporal lobe, and the electrodes were again withdrawn. In the 2 years following her second operation, Doctors

12. Julia's case is set out with great detail in MARK & ERVIN 97-108.

Mark and Ervin were able to report these significant results: Julia had had only two mild rage attacks; but neither her epileptic seizure pattern nor her psychotic behavior had been changed.

B. *Psychosurgery as a Cure for Individual Illness*

Julia's case permits our making certain generalizations about psychosurgery. These generalizations can help us appreciate the elements of risk to the human subjects of experimental brain surgery. First, the patient-subject of a psychosurgical experiment is a seriously ill person. As already mentioned, he is virtually never a healthy volunteer. Second, the crucial focus is on the emotional or behavioral aspect of his illness. Although symptoms of an organic brain disorder may be present, for example Julia's epileptic seizures, the emphasis is on the patient's psychosis, aggressive moods, and assaultive behavior. Third, there is a quality of hit-or-miss and trial-and-error about the efforts to diagnose and treat the patient. This is an inevitable reflection of the present state of ignorance concerning the relationships between brain structure and psychological function or behavior. Finally, the more traditional forms of psychotherapy and drug therapy have usually been tried and these have failed. This failure of other treatment methods produces a sense of desperation in the patient, his family, and his physicians.

The patient faces the prospect of a lifetime in mental hospitals or institutions for the criminal insane. In him, despair merges with the fear that if he is not institutionalized he will someday seriously injure himself or another. His family members have exhausted their emotional, physical, and financial resources through years of struggling with him. In them, despair is accompanied by the frantic hope often seen in families of terminal patients who urge physicians to try any new drug or technique convinced that this will save the patient. His physicians have considered and rejected all practical alternatives to psychosurgery. In them, despair is sometimes joined by a readiness to see the patient as already lost and therefore a candidate for experimental therapy.

Beyond sheer desperation, there are powerful hopes that sustain physician-investigators who implant electrodes and stimulators and who stimulate the brains of violent patients. The major hope is that these experiments will lead to improved diagnosis and more effective treatment of a broad range of mental illnesses, both organic and functional. Electrical brain stimulation might assist in locating tumors and lesions resulting from injuries or infections. Control of epileptic

seizure activity might also be effected. Should investigation ultimately determine there are precise sites in the brain that serve as centers of pain and pleasure, stimulating these centers might relieve intense and intractable pain.

Medical applications for electrical stimulation might be found for many functional mental illnesses and serious disturbances of personality—schizophrenia, anxiety, depression, certain phobias, and a variety of other psychoneuroses. There have also been serious suggestions that stimulation could aid in the treatment of conditions that fall uneasily somewhere between the mental illnesses and the character disorders such as alcoholism and drug addiction.¹³ Those involved in behavior modification will recognize the stimociever's possibilities for conditioning human behavior. Wires connected directly to pleasure and pain centers would permit the devising of programs for administering reward and punishment, programs far more efficient than any used by therapists today. The stimociever might also be used as a cerebral pacemaker to regulate erratic firing of cells in order to maintain the inner stability lacking in a malfunctioning brain.

In order to realize these hopes, the psychosurgeon must create substantial physical and psychological risks to the subjects of his experiments. The physical risks include those inherent in all surgery. Therefore, surgery which involves cutting the scalp, entering the skull, and invading the brain exposes subjects to possible harm from infection and accidental or negligent error. Even when no ablation or deliberate destruction of tissue takes place, the mere insertion and withdrawal of wires causes the destruction of cells and the permanent scarring of tissue along the narrow channels cut by the wires.¹⁴ We tend to discuss brain stimulation procedure as though it called for a single wire to be implanted in a specific predetermined site. In actual fact, it is usually necessary for several wires each with multiple leads to be placed in both brain hemi-

13. See Heath, *Depth Recording and Stimulation Studies in Patients*, in THE SURGICAL CONTROL OF BEHAVIOR 32-36 (A. Winter ed. 1971). Dr. W.B. Scoville has suggested psychosurgery (not limited to stereotaxic electrical brain stimulation) for selected patients with the following conditions: recurrent depression, schizophrenia, psychoneurosis, drug addiction, and alcoholism. Scoville, *The Effect of Surgical Lesions of the Brain on Psyche*, in THE SURGICAL CONTROL OF BEHAVIOR 53-55 (A. Winter ed. 1971).

14. Eccles, *Experiments on Man in Neurophysiology*, in BIOMEDICAL SCIENCE AND THE DILEMMA OF HUMAN EXPERIMENTATION 22-23 (V. Fattorusso ed. 1967) as cited in EXPERIMENTATION WITH HUMAN BEINGS 449-50 (J. Katz ed. 1972).

spheres, since the location of specific sites can only be approximated before the operation. Increasing the number of wires increases the amount of cell destruction and scarring along wire channels, even though no tissue is ablated and all the electrodes are withdrawn. And, if the wires remain in the brain for longer periods, their outer ends fixed to a socket anchored on the skull, additional tissue damage occurs when abrupt head movement takes place. This damage results because the brain "floats" inside the cranial cavity while the rigid wires governed by inertia remain still and cut through adjacent tissue.

It should be stressed that the brain is a hardy organ and psychosurgery skillfully performed carries little risk of death. Where no physical injury or organic disease is present, mortality runs very low. Despite the toughness of the brain, physical risks do exist and, however small their incidence and seriousness, the risks are real.

More important are the psychological risks—the risks to the personality and identity of the patient-subject. Patients, areas of whose brains have been ablated following stimulation, face the possible loss of memory and intelligence or cognitive power. They may find their capacity to feel and display emotion considerably diminished. The cost of eliminating fearful, anxious, or aggressive moods may be the loss of the emotional range that provides richness and variety to human life. It may also include the loss of that quantum of healthy fear necessary to appreciate and avoid harm.

The cells of the brain, at least the cells whose functions relate closely to mental activity, die and do not replace themselves. This makes injury and illness affecting large areas of the brain so tragic. Current neurobiological theory hesitantly suggests the brain has two important characteristics that help counter this unfortunate phenomenon. However, these beneficial characteristics considerably magnify the risks from surgical interventions to modify mood and behavior. The first characteristic is the redundancy of certain nerve circuits carrying impulses through the brain. Normally the same message being transmitted along a neural circuit is being sent simultaneously through other circuits to insure its safe arrival. Therefore, damage to a single circuit does not necessarily end communication between the terminals connected by that circuit. The second characteristic relates to a limited capacity of the brain to continue to perform certain functions apparently lost when a particular structure has been injured. It seems that either the undamaged twin structure in the brain's other hemisphere may duplicate or take over the functions

previously performed or a portion of the vast unused capacity of the brain may relearn the necessary tasks. Whatever the explanation, there is evidence that the brain has mechanisms to protect it against minimal damage, particularly when patients are young.

As a consequence, much of the pinpoint surgical destruction of tissue will not have lasting effects. Aggressive moods, anxieties, and fears thought to have been controlled will often reassert themselves. This puts pressure on surgeons to repeat their interventions in more and larger areas until success is achieved. There is irony in the fact that the very mechanisms effective in protecting brain function against minor injury invite the larger scale destruction that may bring about the loss of that protected function.

In any analysis of experimental control of the mind, one factor must be recognized and fully appreciated. That factor is our ignorance—the fact that we know so little about the conscious brain. This can be demonstrated in the context of experimental electrical brain stimulation. Assume a patient whose principal symptom is his unexplainable, uncontrollable, violent behavior, rather than any clear symptoms of organic dysfunction. Electrodes are implanted in the deep limbic portions of his brain. Should the patient become aggressive while being observed, the investigator electrically stimulates one or another of his brain sites. The investigator discovers that by stimulating a particular area he can eliminate, diminish, or control the patient's aggression.

An explanation offered by certain psychosurgeons is that there is a center in the brain where rage originates in response to threats of danger and that lesions in that center are causing it to malfunction. Cells in the center are therefore firing erratically and prompting exaggerated, inappropriate responses to external events. On the strength of this explanation, the treatment proposed could be to ablate the diseased tissue. And, if the explanation were correct, the ablation might be justified. However, there are alternative theories that weaken this justification.

One theory is that in the brain there is not only a rage center but also an independent site that functions to inhibit rage and control violent behavior.¹⁵ The above experiment may be showing that stimulating the inhibiting center enhances its capacity to control the patient's aggression. Another possible explanation is that still a third site is being stimulated, perhaps a center that evokes pleasure or

15. MARK & ERVIN 108.

euphoria.¹⁶ When this center is electrically stimulated, strong pleasurable feelings may be overwhelming the patient's aggressive mood and in this way distracting him and preventing his violent conduct. This last theory is consistent with our commonsense understanding of how persons are temporarily relieved of physical pain when they engage in pleasurable conversations or witness an absorbing drama.

What the example shows above all is that we know *how* to modify the behavior of our hypothetical violent patient, but cannot yet explain *why* his behavior has been modified. Without confidence in our explanation, without knowing what site we are stimulating or whether the tissue we would ablate is healthy or diseased, the justification for destroying tissue is missing. It has been put irreverently that modifying behavior without an adequate explanation of what operations are involved is like kicking a candy machine to make it drop a purchase.¹⁷ It would seem better to investigate whether the device for receiving coins was bent or the lever for releasing the candy bars was defective rather than to continue kicking the machine, even if sometimes it drops a bar after a kick.

Because of our ignorance, psychological injuries—losses in memory, intelligence, and emotion—are difficult to detect and measure. Nevertheless, we know the risk of serious psychological injury is substantial. This contrasts with the fact that psychosurgery involves only slight risk of death. Perhaps that physical death does not often occur may cause the psychosurgeon to underestimate the overall risk he creates.¹⁸ For, when life in the body continues, the death of the inner person may occur and the event may go unnoticed or unappreciated. This is the real risk to human subjects that stems from psychosurgery.

C. *Psychosurgery as a Cure for Social Ills*

All proponents of psychosurgery hope their new techniques will alleviate the suffering of persons with serious mental illnesses and

16. DELGADO 142-47.

17. The analogy between curing mental illness by the ablation of brain tissue and fixing a machine by kicking it is borrowed from Dr. Stephen Rose, who uses faulty radios instead of a candy machine. S. ROSE, *THE CONSCIOUS BRAIN* 258 (1974).

18. But there is an important, perverse quality to this low-mortality aspect of psychosurgery. In other kinds of experimental surgery, for example heart transplants, high mortality rates are characteristic. The strong likelihood that death may follow his best efforts is sobering to the surgeon.

personality disorders. Among these proponents is a smaller group who hope that psychosurgery may also cure some of the ills from which society suffers. There is something promising about the notion that the effort to cure sick individuals may result in considerable social benefit as well. But there is something disturbing about the conscious and direct effort to use medicine and medical men and institutions to cure a "sick" society. For it is one thing to use medicine as an instrument for healing and quite another to use it as an instrument for social control. Analyzing the social problem of violence exposes the risks involved in such efforts.

1. *The Problem of Violence.*

For many in America, violence is the most real and frightening fact in their lives. It means death, injury, fear, and anxiety for those victimized by it. By creating a climate of insecurity, violence threatens the fragile sense of community necessary for people to live together. And though it is sometimes forgotten, people who victimize others are often victims of their own behavior. Their uncontrollable impulses continually torment them and frequently cause self-inflicted injury and suicide. The human costs of the physical and psychological harm caused by violence are beyond calculation. Perhaps more costly in the long run is the harm done the delicate political balance between freedom and security. For violence, if uncontrolled, nurtures groups in our society capable and willing to provide security at the expense of freedom.

The problem of violence has usually been approached in two ways. One calls for strengthening our methods of law enforcement and improving our procedures for administering the criminal justice system. Proposals adopting this approach rely on increased use of public force—more police and heavier penalties—to prevent and punish criminal behavior. Although use of public force is essential to control the violent, excessive use of force becomes repressive and leads to new conflict, violence, and social disorder. The other approach focuses on the deeper causes of violence embedded in our social environment. Typical proposals here aim at eliminating poverty, slums, unemployment, and discrimination, the conditions which foster violence in our cities. The thought behind them is that we will not have a society both free and secure until most citizens believe the conditions they must live in and the rules they are expected to obey are just.

These two approaches share an assumption about how people

behave. It is that restructuring the social environment will have an impact on individual impulses to commit aggressive acts. Law and order proponents believe the threatened use of force will effect control over behavior by overwhelming the individual's impulse to do harm. On the other hand, those who would improve social conditions believe that eliminating felt injustice will effect control over behavior by reducing the individual's impulse to do harm. Both approaches assume that society and law are for the most part dealing with responsible individuals who possess well-ordered minds.

2. *A Medical Approach to Violence.*

Doctors Mark and Ervin, in *Violence and the Brain*, challenge this assumption. They stress that much of the time society is dealing with violence produced by abnormally functioning brains. They believe the solutions that concentrate on more law enforcement and ending social injustice, although reasonable in themselves, ignore the fact that often violent individuals are mentally ill. They urge that greater efforts be made to identify and treat potentially violent persons who may be suffering from serious brain dysfunctions. In essence, their complementary approach deems much of the violence we witness to be a medical problem to be dealt with by physicians.

Thus, Doctors Mark and Ervin recommend establishment of a program to study a large group of violent individuals with "brain dyscontrol syndrome." A syndrome is a collection of symptoms and not a disease as such. The crucial symptoms of brain dyscontrol relate to social factors and not physical ones. Some of the individuals to be studied would indeed have organic or functional mental diseases. The doctors believe such factors should be identified because they are potentially treatable. Studying their diseases can provide information needed to develop improved neurological and psychiatric tests for detecting violence-prone individuals.¹⁹

19. The program would have facilities to detain the dangerous persons being studied and to house the staff comprising expert neurologists, psychiatrists, and neurosurgeons. Assisting the staff would be teams of social scientists, psychologists, lawyers, criminologists, cytogeneticists, and public health specialists. Comprehensive brain examinations and other studies of the inmates would be conducted; these would include: (1) a social history, (2) a psychiatric examination, (3) neurological and general physical examinations, (4) psychological and general physical examinations, (5) psychological tests assessing personality and intelligence, (6) laboratory examinations consisting of multiple recording of brain waves, X-ray filming of the head, visual field and hearing tests, and if necessary, isotopic brain scans and special X-ray filming of the brain, and (7) a genetic evaluation and investigation of the family history for

The proposed study would draw its subjects from two sources. First, there would be persons who had recognized their inability to control their aggressive behavior and who had referred themselves to a hospital which would then channel them into the program. Second, there would be persons whose violent, antisocial behavior had brought them to the attention of the courts and who were being confined before trial or while serving sentence.

In both groups, individuals would be screened to see if they have dyscontrol syndrome. The four characteristic symptoms of this syndrome are:

- (1) a history of physical assault, especially wife and child beating; (2) the symptom of pathological intoxication—that is, drinking even a small amount of alcohol triggers acts of senseless brutality; (3) a history of impulsive behavior, at times including sexual assaults; and (4) a history (in those who drove cars) of many traffic violations and serious automobile accidents.²⁰

Candidates for study would be selected from among those with all four characteristics. The authors hope that intensive testing and study of this group would lead to a satisfactory method for determining and distinguishing between sociological and biological causes of violent behavior.

Doctors Mark and Ervin believe it would be necessary to go beyond these traditional methods to identify a smaller sample within the group who possessed additional abnormalities—chromosomal, electrophysiological, neurological, and psychological. By implanting electrodes in these particular individuals, researchers would have an unusual opportunity to correlate these abnormal conditions with anomalies in limbic brain function and psychological activity. Electrical brain stimulation would increase the likelihood that “an as yet unperceived relationship might emerge from such studies that would give us a simple test to help predict accurately whether a given person has a dangerously low threshold for impulsive violence.”²¹

In the final phase of the program, individuals found to have low violence thresholds would have to be treated. First, improved techniques in behavior therapy and new anticonvulsant and tranquilizing drugs would be tried. For some, these new psychotherapeutic methods and medicines would succeed. However, for many

instances of mental impairment and congenital deformities. MARK & ERVIN 157.

20. *Id.* at 126 (footnote omitted).

21. *Id.* at 158.

they would fail. These patients would require surgery. Physicians would make small lesions in the subject's brain tissue using electrical stimulation techniques. It is a permissible inference that in appropriate cases they would also implant stimocervers to monitor their patients, recognizing as they do the stimocerver's capacity for more continuous and effective control of behavior.

3. *Medicine and Social Control.*

The program outlined here is a responsible attempt by eminent physicians to focus their research and apply their skills to the problem of violence. For precisely this reason, the risks it holds and the risks it may lead to should be examined carefully. Beyond the hazards to individual subjects of psychosurgery, there are risks for others in society when medicine involves itself in social control.

The "others" include the potential subjects of mind control experimentation who fall into these categories of violent people: (1) those with a recognized organic or functional mental illness; (2) those honestly believed to be mentally ill, for "they couldn't possibly act that way, if they weren't sick"; and (3) those not believed to be ill, but who by word and deed deeply disturb society or infect it with ideas that lead to disorder. The lines between these three categories are blurred. This blurring reflects the difficulty medicine has in drawing lines to distinguish the normal from the abnormal or mental health from mental illness. Nonetheless, the categories are useful to appreciate the dangers stemming from efforts to cure a sick society.

The shift from healer to social controller occurs unconsciously when physicians minister to persons who are truly ill, those in our first category. An example might be when treatment is given inmates of large understaffed mental hospitals. Many of these patients are being treated with psychopharmaceuticals. Heavy doses of drugs are often given indiscriminately to enable the few, under-qualified attendants to manage these patient populations.²² These dosages, unrelated to particular mental problems of particular patients, must be viewed primarily as techniques of control and not treatment measures. The practice is also standard for hospital wards of prisons.²³ And, in the world outside these institutions, psycho-

22. A. BROOKS, LAW, PSYCHIATRY AND THE MENTAL HEALTH SYSTEM 878 (1974).

23. For a general discussion of techniques used to manage prisoners and mental patients see Note, *Conditioning and Other Technologies Used to*

therapists, anxious to keep their communities safe use drugs to manage their patients and not merely treat them. Should widespread use of psychosurgery become feasible, its application to institutionalized populations would increase, prompted by the unconscious motivation to control rather than heal.

A physician may honestly believe a violent person is ill and needs treatment even though there is only evidence of his antisocial behavior and virtually no evidence of organic or functional disease. The thinking of the physician or rather his attitude seems to be this: "I have had patients with clear medical symptoms of known mental illness who committed acts of violence, acts caused by their disease. I am now examining a person who has committed similar acts of violence. Although he displays no medical symptoms, he must have a mental illness."

For example, in the Soviet Union psychiatrists may sincerely believe the political dissenters who angrily oppose the regime are mentally ill. These physicians may cooperate in treating the dissenters when they are committed to mental hospitals.²⁴ Viewed by a physician who believes his political system to be reasonable, the antagonistic behavior and excessive hostility to legitimate authority exhibited by these patients can be characterized as resulting from distorted perceptions and an inability to deal with reality. Deficits in perception and an incapacity to recognize reality are the hallmarks of psychosis. The dissenters' suspicions and tendency to attribute evil to others can be seen as the symptoms of paranoia. Doubtless, some dissenters are psychotic and have paranoid personalities. However, patients whose views of the regime are not distorted and whose suspicions of Soviet leadership are warranted are also being treated for illness. When these physicians make diagnoses, relying solely on the evidence of abnormal or deviant political behavior and do so despite medical evidence indicating mental health, they are assisting in the state's function of social control.

Soviet psychiatry is not alone. In this country, drugs, usually amphetamines, are presently being administered to tens of thousands of school children whose frenetic behavior is the major, sometimes the sole symptom supporting a diagnosis of mental illness—hyperkinesis.²⁵ These overactive children may in fact have developed

"Treat?" "Rehabilitate?" "Demolish?" *Prisoners and Mental Patients*, 45 S. CAL. L. REV. 616 (1972).

24. S. ROSE, *supra* note 17, at 299.

25. For a general statement of the problems arising from efforts to deal

hyperkinesis as a sequel to genuine, organic brain damage. However, quite often there is no evidence of damage or any other physical symptoms. This means a child's condition falls in no accepted diagnostic category of disease. Labels such as "minimal brain dysfunction" are sometimes used to mask the fact that behavioral patterns of overactivity rather than diseases are being treated. Many school systems now have programs to identify hyperkinetic children and recommend their treatment with drugs. It seems reasonable to conclude that many of these youngsters are not sick. They are "troublemakers" with serious behavior problems. These children should be dealt with in some way, but not necessarily with medicine.

These examples from home and abroad suggest disturbing parallels to Mark and Ervin's study program. The characteristics of a brain dyscontrol syndrome used to screen participants are descriptions of behavior not symptoms of disease. After the first phase of testing those selected, some of the participants would be determined to have either an organic or functional illness. For them traditional therapy would begin. If this failed they would become subjects for diagnosis by psychosurgical methods. However, tests of others would reveal no medical evidence of either organic or functional disease. Traditional methods of psychotherapy would be tried. If these failed to improve their conditions, further diagnosis by electrical stimulation would be almost a certainty despite their having only a dyscontrol syndrome.

It is my firm belief that after diagnosis, there would be no turning back and psychosurgery—either ablating tissue or implanting stimulators—would follow. To appreciate this position, imagine a patient with no structural or organic mental disorder, that is, with no evidence of tumor, lesions, or diseased tissue. Diagnostic tests that involved stimulating his normal limbic brain could nonetheless provoke his aggressive impulses or control his aggressive moods. Thus, in the assumed absence of a diseased condition, the diagnostic test itself would have demonstrated the existence of a remedy for the patient's behavior disorder. It might prove almost impossible to avoid using this remedy on a known, dangerous individual. In this program, justification for the use of psychosurgery is built into the initial working hypothesis or assumption that impulsively violent

with hyperkinetic children see *Hearings on Federal Involvement in the Use of Behavior Modification Drugs on Grammar School Children Before a Subcomm. of the House Comm. on Government Operations (The Right to Privacy Inquiry, 1970)*, 91st Cong., 2d Sess. 1-74 (1970).

persons are sick or may be dealt with as though they were. Neither law nor psychiatry makes this assumption. Both disciplines recognize that violent conduct and behavior may be the product of an anti-social character disorder and not necessarily the result of an illness.

These last remarks bring us to where we can analyze efforts to control persons in our third category—those not believed to be mentally ill, but whose continued violent behavior threatens the social order. These include criminals who may rob, assault, or murder out of anger or for gain, or who may commit similar violent acts for political or other reasons. And, depending on who does the classifying, dissenters who merely advocate violence to bring about social change might also be included. For many, frustration grows as society proves unsuccessful in coping with violence by traditional legal methods of social control. Such frustration convinces them to look to science and medicine for more effective control of these persons.

Nothing in *Violence and the Brain* remotely suggests the authors contemplate using psychosurgery to physically control the minds of such individuals. However, recent experience in human experimentation does suggest there is danger in beginning a program that could be readily adapted to control criminals, political or otherwise.

Experiments have been conducted at a California medical facility to test the aversive conditioning effects of anectine (succinylcholine) on persons predisposed toward violence.²⁶ Sixty-four inmates participated. They were criminal offenders with past histories of violent conduct, including episodes while in confinement. Each was administered anectine immediately following any incident in which he acted out an aggressive impulse. Anectine causes muscle paralysis and an intense and frightening feeling you are drowning. While in a conscious but paralyzed state, the prisoner was admonished for his behavior. The investigators sought by these measures to determine whether impulsively violent persons could be conditioned to control their own aggressive impulses. It is significant that 5 prisoners were included in the project against their express will, while 18 others felt they had been pressured to consent.²⁷ Both consenting and noncon-

26. See Mattocks & Jew, Assessment of an Aversive "Contract" Program With Extreme Acting-Out Criminal Offenders (unpublished ms. 1971), cited in EXPERIMENTATION WITH HUMAN BEINGS, *supra* note 14, at 1016-18.

27. Hearings on S. 974, S. 878, and S.J. Res. 71, Before the Subcomm. on Health of the Senate Comm. on Labor and Public Welfare (*Quality of Health Care—Human Experimentation*, 1973), 93d Cong., 1st Sess., pt. 1, at 844 (1973).

senting prisoners were engaged in a project using medicine to control behavior. This was, of course, the point of the experiment. It is not fanciful to predict that prison hospital physicians would conduct experiments with the stimoceiver—a more efficient instrument for conditioning behavior than anectine—should stimoceivers become available to them.

4. *The Stimoceiver and Control of Violence.*

Society faces a serious dilemma—what to do with certain institutionalized criminals and mental patients? Confinement often causes violence-prone prisoners to become more hostile and aggressive. Upon release, they are greater risks to society. Similarly, confinement may worsen the condition of inmates of mental institutions. Yet these mental patients pose a considerable threat to themselves and others in the community if unrestrained. The dilemma would be resolved if potentially dangerous persons could be released and their behavior effectively monitored. The stimoceiver, with its capacity to provide continuing, remote, physical control of the mind, could serve society as such a monitoring device. It would provide continued surveillance of the moods of these individuals. The stimoceiver would register abnormal electrical discharges in aggression centers, the prelude to assaultive behavior in these persons, and would radio this information to a computer. The computer would return a signal causing control centers to be stimulated, which would inhibit the violent impulses rising in the subject and control them.

This use of the stimoceiver is certainly not being advocated here. Far from it. But its possible use must be contemplated. Consideration has already been given to the use of the "Schwitzgebel device" to assist in rehabilitating chronic recidivists.²⁸ This device is a small radio transmitter that can be unobtrusively strapped to a person to monitor his movements. It sends information about his location to a police station or his probation officer to guarantee model behavior. Its possibilities for invasion of privacy and infringement of other civil liberties are enormous. The stimoceiver's possibilities would seem to be even greater as it can communicate to the brain at a nonsensory level. Therefore, as a cerebral pacemaker it could control a range of human behavior without the conscious participation of the subject. In drawing this parallel it is particularly interesting that the Schwitz-

28. Schwitzgebel, *Issues in the Use of an Electronic Rehabilitation System With Chronic Recidivists*, 3 LAW & SOC'Y REV. 597 (1969).

gebel device has been recommended for its medical applications. It could monitor the heart rate and geographic location of cardiac patients and send emergency signals in cases of acute infarction. Another medical application could be to keep track of mental patients who get lost and confused and to safeguard them if they have suicidal tendencies. Thus, as in the case of the stimoceiver, the application of the Schwitzgebel device falls into the gray area where one is not sure whether he is witnessing care for the sick or control of the mentally ill who may endanger society.

Society may someday turn to stimoceivers, Schwitzgebels, and similar devices already dreamed of, but yet unborn. The justification will be that, despite the dangers, the magnitude of the social problem of violence made this necessary. If this occurs, medicine will have become a partner with law in the direct control of human behavior. Unfortunately, this solution will produce fecund hazards—hazards society might not wish to encounter even to rid itself of violence.

The decision to use psychosurgery on the violence-prone would jeopardize the interests of individuals with uncontrollable impulses not related to violence. Social problems like alcoholism, drug addiction, and sexual deviance are waiting just down the line. They invite the same kind of programmatic psychosurgical solution that Doctors Mark and Ervin recommend for violence, and with the same risks.

Neither the law nor medicine is very clear whether the alcoholic, addict, or homosexual should be classified "sick." Despite much uncertainty, the law has traditionally imposed criminal sanctions on them for conduct that results from a condition that is arguably an illness. Recently, however, law has begun a slow move to the position that alcoholism, drug addiction, and homosexuality are signs of sickness and not merely antisocial conduct.²⁹ It would be ironic if medicine found itself using psychosurgical techniques to control persons out of fear of the social consequences of their behavior instead of out of concern for them as sick individuals.

D. *Toward a Psychocivilized Society*

It is becoming a favorite and gloomy theme of the philosophers of science that man has succeeded in developing technological

29. See, e.g., *Robinson v. California*, 370 U.S. 660, *rehearing denied*, 371 U.S. 905 (1962) (involuntary drug addiction); *Driver v. Hinnant*, 356 F.2d 761 (4th Cir. 1966) (chronic alcoholism); cf. *Griswold v. Connecticut*, 381 U.S. 479 (1965).

mastery over physical nature, but has failed to develop mastery over human nature or mastery of himself. According to these philosophers, science pours out discoveries effective at shaping the physical environment, while nothing science has discovered in the past several thousand years has improved man's ability to shape his inner environment, his mind. As the rate of technological progress increases, man's power to destroy himself increases with it. When compared to his technological achievements, man's emotional maturity has developed very little, so little that "the probability of self-induced extinction [is] approaching statistical certainty."³⁰ Man now represents the greatest threat to his own existence.

In the face of these predictions, there stands the optimism of Dr. Jose M. R. Delgado, Yale Professor and authority in neurobehavioral research in animals and humans. A leader in the development of electrical brain stimulation techniques and the father of the stimociever, Dr. Delgado believes "[w]e are at the beginning of a new ideological and technological revolution in which the objectives are not physical power and control of the environment, but direct intervention into the fate of man himself."³¹ It is the thesis of his important book, *Physical Control of the Mind: Toward a Psychocivilized Society*, that

[W]e now possess the necessary technology for the experimental investigation of mental activities, and that we have reached a critical turning point in the evolution of man at which the mind can be used to influence its own structures, functions, and purpose, thereby ensuring both the preservation and advance of civilization.³²

He believes that for man to take a hand in his own evolution is not to exhibit hubris. Rather, it is the natural consequence of man's having evolved a mind possessed of insight and awareness, a mind capable of modifying emotions like aggression that beyond a certain point have no survival or adaptive value.

For Dr. Delgado violent behavior is a product of the cultural environment. If someone overreacts to a physical threat and uses more force than a situation reasonably calls for, it is because his culture taught him to react that way; he has been educated that way. Education becomes the key. It is the role of education to shape internal controls in individuals so they can withstand external environmental

30. A. KOESTLER, *THE CALL GIRLS* 58 (1971).

31. DELGADO 246.

32. *Id.* at 19-20.

pressures and maintain their internal balance. Education will be aided by the new experimental approach. The use of electrical brain stimulation will improve our understanding of the neuronal basis of individual behavior. Acquisition of knowledge about brain physiology will lead to practical social applications that will in turn produce

the integration of neurophysiological and psychological principles leading to a more intelligent education, starting from the moment of birth and continuing throughout life, with the preconceived plan of escaping from the blind forces of chance and of influencing cerebral mechanisms and mental structure in order to create a future man with greater personal freedom and originality, a member of a psychocivilized society, happier, less destructive, and better balanced than present man.³³

Dr. Delgado adds to this statement the hopeful note that “[w]e are now on the verge of a process of mental liberation and self-domination which is a continuation of our evolution.”³⁴

Dr. Delgado is aware his optimism is not shared and his ideas elicit anxiety. He assures the fearful that experimental brain stimulation will not be abused because “the procedure’s complexity acts as a safeguard against the improper use of ESB by untrained or unethical persons.”³⁵ He is not convincing. “Untrained persons” are investigators most likely to be ignorant and unappreciative of complexity. They may often barge ahead despite, or because of, their lack of training. “Unethical persons” are those insensitive to latent moral issues. Their insensitivity will be more dangerous by virtue of the complicated nature of these procedures. The complexity that gives Dr. Delgado confidence would most likely be a safeguard against the detection of ethical abuses.

He is also aware that psychosurgery creates anxiety. Thinking about it, we conjure up an Orwellian picture of ruthless dictators pushing buttons to control the masses. He views this as quite improbable. Rulers will not turn to electrical brain stimulation, he believes, because psychoactive drugs and classic measures of punishment and reward are nearly as efficient and are far simpler to use when inducing changes in behavior. Psychosurgery will not be used to limit individual freedom because there are better methods available to dictators for doing the job. It would be truly surprising if this view dispelled the anxiety caused by his proposals.

33. *Id.* at 223 [footnote omitted].

34. *Id.*

35. *Id.* at 194.

How are we to understand the distance separating the hope that the new procedures will bring about a psychocivilized society and the fear that they will inevitably produce a grim state of unfreedom? We must understand that he assumes electrical stimulation of the brain will not be used to provide direct solutions to the problem of undesirable aggression. "This is only a methodology for investigation of the problem"³⁶ He believes the solutions will be achieved indirectly. They will come as the newly acquired information about mental processes and development leads us to the design of more intelligent systems of education. His program does not call for continued direct manipulation of individuals by remote control.

His assumption as to how psychosurgery will be used permits him to ignore an important phenomenon. The discovery and development of the means to physically control minds is the creation of power. One can accept the proposition that power is neutral, a force for good or evil depending on the purposes of the user. However, it is not his purposes we fear, but the purposes of those who will hold the power he has helped create. Although he would not directly manipulate men's minds, others will. What men can do, they will do. History records few successes for the well-intentioned scientist who would limit applications of his dangerous discovery to benevolent ends. The scientific establishment failed—if indeed it attempted—to limit the use of atomic power to its peaceful applications.

The crucial issue Dr. Delgado has opened up is whether we can choose what kind of persons we want to be. He deems the prescription "Know Thyself" to be inadequate. You must, he urges, "Construct Thyself" as well.³⁷ In a world where men have the power to mold minds, this exhortation must be rendered: "Permit Thyself to be Constructed by Others." Mind-shaping power will be possessed by some men—not all. The most important fact to be understood is that "the power of Man to make himself what he pleases . . . [is] the power of some men to make other men what *they* please."³⁸

The solutions to man's violence that rely on psychosurgery's capacity to psychocivilize society are solutions trapped in a vicious circle. Giving the scientific power to cure aggression to men with political power, who themselves are aggressive, demonstrates this.

36. *Id.* at 133.

37. *Id.* at 244.

38. C. LEWIS, *THE ABOLITION OF MAN* 72 (1947).

To see this more clearly, we must begin over and ask—What is our problem? It is that culture has not developed either the social controls or the inner mental controls to restrain men's impulses to violence. Therefore, we find men with political power who are able to terrorize vast populations and destroy mankind itself. The proffered solution involves using psychosurgery to humanize them, to eliminate their otherwise uncontrollable aggressive impulses. But the choices of who will undergo psychocivilizing operations will be made by the very men with political power who we have assumed are not yet humanized. The powerful, not the meek, are destined to inherit the technological instruments of mind control. As things in this world presently stand—before the advent of mass psychosurgery—there is good reason to doubt that the meek will ever inherit the earth. They surely will not, should uncontrolled political power merge with the scientific power to control the mind.

Paradoxically, the optimistic proposals for man's self-modification and control of his evolutionary future are impelled by despair over man as he is. Paul Ramsey, in *Fabricated Man*, describes why scientists despair.

Because those who come after us may not be like us, or because those like us may not come after us, or because after a time there may be none to come after us, mankind must now set to work to ensure that those who come after us will be more and more unlike us.³⁹

Despair is reinforced by frustration over man's slow, clumsy, inefficient efforts to change his environment. Frustration pushes some to remake man so he can adjust to society, rather than to remake society, the much more difficult task. In this, there is more of the impatient mechanic than the patient cultivator, more of the constructor of machines than the nurturer of growing things. We who must gamble on the future of mankind should not put our money on the mechanics.

At the heart of the proposals to move toward a psychocivilized society using physical control of the mind is the principle that man must conquer human nature. Do we really understand what this conquest would mean? If man succeeds in conquering human nature, he will have driven out of mankind the peculiarly human qualities that evolution has labored so long to produce. What is human will have been conquered. What will be left is nature. Nature—instinct and impulse—unbridled by respect for human

39. P. RAMSEY, *FABRICATED MAN* 159-60 (1970).

dignity and freedom would be in supreme control.⁴⁰ This is the long term risk of radical efforts to bring us closer to a psychocivilized society. It is an enormous error to minimize this risk, to ignore the need for psychosurgery to be subjected to political and social control from the outset.

E. *Further Thoughts on the Calculus of Risk*

Considerable space has been given here to the discussion of the two books authored by Doctors Mark and Ervin and by Dr. Delgado. The distinction of these physicians and the importance of their contributions in neurosurgery, psychiatry, and neurophysiology have made it necessary to consider seriously their proposals—proposals which would greatly increase the use of brain stimulation techniques to modify behavior. In a real sense, this article is a response to the challenge to law and ethics presented by their ideas. There remains one further thought about why their ideas are so discomfiting. Reflecting on these ideas, one does not get the feeling that clinical investigators in psychosurgery appreciate that the brain is not just another organ of the body. One never feels that for them surgical intervention affecting brain structures differs significantly from innovative surgery performed on other parts of the body.

Comments like this—that the brain is unique—when accompanied by reservations about the propriety of surgical modification of behavior, evoke a predictable response from brain researchers. They have heard similar comments whenever scientific discovery has wounded man's pride: when Copernicus proved man's world was not the center of the universe; when Darwin demonstrated man was descended from the lower animals; and when Freud established that man's unconscious, not his controllable conscious mind, determined the pattern of his thoughts, moods, and behavior. Now man's pride is again hurt by discoveries that mental activity, man's special gift, may be no more than the product of chemical and electrical activity in his brain. Mind is not an independent element, but rather the sum total of physical brain activity.

If mind is viewed in this scientific and objective light, as the researchers view it, there is no justification for the superstitious reverence in which we hold the brain. This reverence is itself the product of culturally determined attitudes, myths, and misconcep-

40. This is the burden of C.S. Lewis' excellent little study, *supra* note 38, at ch. 3, in particular.

tions about the mind and its relation to brain function. That these attitudes hold back scientific investigation in this field is implicit in the researcher's viewpoint. They are similar to former attitudes about the heart, once thought to be the seat of all human emotions and, therefore, sacrosanct and untouchable by the surgeon's knife. Moreover, innovative heart surgery is now performed regularly although much of it involves a vastly higher risk of death than does psychosurgery. Despite this risk, an enlightened public does not become unduly frightened. Therefore, in the calculus of risk in psychosurgery, researchers would give no special weight to the fact that it is the brain on which we are experimenting.

There is in this response a proper note that should caution the more hysterical critics of psychosurgery. But one cannot escape the feeling that someone is busily cutting down a straw man; or if not a straw man, then the wrong man. Serious critics observe the difference between heart surgery and psychosurgery to lie in the purposes of the intervention. Of course surgeons in both cases are operating on human tissue; it is not advanced that some intangible substance called mind is being operated on directly. However, it needs restating that psychosurgery alters the physical structures of the brain avowedly for the purpose of modifying the mind, however "mind" be defined. In sharp contrast, the aim of heart surgery is solely to correct structural defects, nothing more.

When a heart is replaced, the donee, the new owner, remains the same old person. However, if brain transplants were possible, the donee of the new brain would become a new person. It would be necessary to view the recipient of the transplanted brain as in fact the donor of his body. The physical structure of the brain cannot be altered substantially without affecting the intellect and emotions, without changing who a person is. The death of the mind and personality is an event of tragic consequence even if the body containing them continues to live. For, in the human subject, if there is a physical site that relates to the identity of the person, the individual self, it is the brain and the higher structures of the central nervous system. It is not merely superstitious reverence for the brain that creates anxiety when we learn about uncontrolled experiments in psychosurgery. Culturally determined though it may be, it is our deep reverence for the self, the individual, that promotes our fears. We are properly fearful when whatever it is that makes us uniquely human is handed over to the psychosurgeon to be molded or remade: We stress the special status of the human brain not to restrain experi-

mentation but to insure that the reverence and respect owed the dignity of the individual is fully shared by the experimenters.

Before concluding these reflections on the calculus of risk, we should do more than present a "parade of the horribles" involved in psychosurgery. It should be possible to put values on the various elements of risk and then weigh them against the hoped-for benefits of research in the physical control of the mind. Some calculation of net social advantage over disadvantage should be offered to guide investigators and policymakers in this area. However, the calculation of hopes and hazards depends on knowledge we do not have. It has been a major theme of this article that we simply do not know enough to permit a judgment that the scientific advances in psychosurgery are worth the social costs. We do not know how many psychosurgical operations are taking place, who performs them, what technical skills the surgeons who perform them possess, who the typical patients are, and what illnesses they present. We hardly know enough to ask the right questions. But among them must be the questions related to the control of the process for developing and for applying psychosurgical techniques. We turn to these questions now.

IV. THE CONTROL OF PSYCHOSURGERY

In July 1974, Congress passed the National Research Service Award Act.⁴¹ Title II of this Act provides for the establishment of a National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The Commission's charge is to make a comprehensive investigation and study of the ethical principles involved in the general conduct of research using human subjects with an eye to developing the guidelines and machinery that will better protect these subjects.⁴² In addition, the Commission must study the nature and extent of research involving living fetuses.⁴³ And, relevant for our purposes, the Commission

shall conduct an investigation and study of the use of psychosurgery in the United States during the five-year period ending December 31, 1972. The Commission shall determine the appropriateness of its use, evaluate the need for it, and recommend to the Secretary [of Health, Education, and Welfare] policies defining the circumstances (if any) under which its use may be appropriate.⁴⁴

41. Pub. L. No. 93-348, 88 Stat. 342.

42. *Id.* § 202(a).

43. *Id.* § 202(b).

44. *Id.* § 202(c).

Congress has also required the Commission to make a comprehensive "Special Study" into "the ethical, social, and legal implications of advances in biomedical and behavioral research and technology."⁴⁵ Reflected here is Congress' concern not only for individual human subjects, but also for the long term implications for society of human experimentation, implications that are neither understood nor appreciated.

Whatever else the Commission's investigation into psychosurgery may disclose, it will show that we are relying almost exclusively on the inner ethical and professional constraints of individual experimenters to protect human subjects and society. To a great extent this reliance is necessary, for as a practical matter no amount of external policing can fully guarantee our safety against ignorant or unethical conduct. Yet reliance solely on inner controls is rarely justified. Where physical control of the mind is involved, this reliance seems particularly unwise. At present, there are two additional ways we theoretically effect a measure of control over decisions to perform psychosurgery. They are (1) control by the subject himself through the granting or withholding of informed consent⁴⁶ and (2) control by hospital review committees through the granting or withholding of approval of an investigator's research protocol. How effective these present controls are and what steps are necessary to control psychosurgery in the future must now be considered.

Leaving the decision to perform psychosurgery to the patient and his physician offers too little protection for the patient-subject. The difficulty lies in the virtual impossibility of securing his voluntary consent in these cases.⁴⁷ We may assume that fully informed consent can be an effective control when treating physical disorders where the consequences are familiar and relatively predictable and even where there may be a novel and unpredictable element. However, when the patient is mentally ill the voluntariness of his consent should be questioned. And, the efficacy of that consent as a control must be questioned as well. A close study of a psychosurgery case reported by Doctors Mark and Ervin shows why.

In *Violence and the Brain*, Doctors Mark and Ervin give an

45. *Id.* § 203.

46. Spoonhour, *Psychosurgery and Informed Consent*, 26 U. FLA. L. REV. 432 (1974).

47. Ratnoff, *Who Shall Decide When Doctors Disagree? A Review of the Legal Development of Informed Consent and the Implications of Proposed Lay Review of Human Experimentation*, 25 CASE W. RES. L. REV. 472, 495-99 (1975).

account of their considerable efforts to obtain consent from Thomas, one of their patients.⁴⁸ At issue was whether he would agree to undergo electrical brain stimulation followed by stereotactic surgery to create lesions in his amygdala. This was to be done to control his rage attacks. Their account is reported here at some length because it emphasizes how substantial their efforts were to obtain consent and because it exposes the dilemma facing psychosurgeons, a dilemma that makes all such efforts futile. Thomas' chief problem was his violent rage, which he directed at coworkers, strangers, but mostly his wife and children. He was paranoid; he interpreted innocent remarks as insults and permitted these to anger him to the point where he would explode in assaultive behavior. He was referred to Doctors Mark and Ervin by psychiatrists who had reported seizure activity typical of temporal lobe epilepsy, periods of confusion, a few psychotic delusions, and hallucinations. Over 7 months he failed to respond to drug therapy, so the decision was made to treat him by stereotactic surgery. "Arrays of electrodes" were implanted in both the left and right temporal lobes, the strands ending in his nucleus amygdala. For 10 weeks, various points on the electrodes were stimulated in a random manner and his responses noted. Thomas had no way of knowing when or if stimulation was taking place. The doctors found that stimulating one particular area of the amygdala caused him pain and loss of control. However, stimulating another nearby area resulted in his becoming hyperrelaxed. He reported a "feeling like Demerol," "I feel so relaxed," and "I feel like I'm floating on a cloud."⁴⁹ After stimulation of this second area, these feelings of relaxation took 4 to 18 hours to dissipate. By stimulating these electrodes every day, the doctors kept Thomas rage free for 3 months.

Doctors Mark and Ervin describe the next stage in their treatment of Thomas in these words:

However, it was obviously impractical to keep doing this for the rest of Thomas's life, and so we suggested to him that we make a destructive lesion in the medial portion of both his amygdalas—that is, in the area where stimulation elicited pain and rage. He agreed to this suggestion while he was relaxed from lateral stimulation of the amygdala. However, 12 hours later, when the effect had worn off, Thomas turned wild and unmanageable. The idea of anyone's making a destructive lesion in his brain enraged

48. MARK & ERVIN 92-97.

49. *Id.* at 96.

him. He absolutely refused any further therapy, and it took many weeks of patient explanation before he accepted the idea of bilateral lesions' being made in his medial amygdala. Four years have passed since the operation, during which time Thomas has not had a single episode of rage. He continues to have an occasional epileptic seizure with periods of confusion and disordered thinking.⁵⁰

This picture shows how seriously ill the candidates for psychosurgery are, how knowledgeable and concerned their physicians may be. (It shows little of the intense excitement felt by the physician engaged in these explorations into the minds of the patients.) It clearly demonstrates the difficulty of obtaining consent in these cases.

In respect to whether a patient exerts significant control over a psychosurgeon, we must focus on one feature of Mark and Ervin's report. Thomas "absolutely refused any further therapy, and it took many weeks of patient explanation before he accepted the idea of bilateral lesions' being made in his amygdala." Perhaps we are seeing persuasion and not subtle coercion, an appeal to the patient on the basis of the reasonableness of the innovative treatment proposed by his doctors. We may only be seeing something common to all cases where a patient must choose to accept treatment, having evaluated the advantages and risks involved in the light of his own interests as he sees them. Perhaps. But there seems to be something different in most psychosurgery cases, something that may make all the difference. Thomas was mentally ill, confused and disordered in his thinking. He was psychotic and suffering delusions and hallucinations. Did he consent to or participate in the decision that was reached? Could his mind and will have operated to evaluate and determine what should be done? Did he *agree* to undergo the surgery that, while it eliminated his rage episodes, left him still subject to epileptic seizures, confused and disordered in his thinking?

When he was calmed by electrical stimulation, he seemed to agree, but when "out from under" he violently reacted to the suggestion of psychosurgery. Appreciating the sensitivity of his physicians, one must believe that when he finally accepted, Thomas was neither sedated by stimulation, nor raging, nor delusional. However, he must have been in a tormented condition characterized by mental anguish and despair over the prospect that without the surgery he would cause serious harm to himself or another in the future. In this condition, he "accepted the idea" of psychosurgery.

50. *Id.* at 96-97.

But his consent, in any relevant sense of the word, was lacking; Thomas did not participate in the decision that he undergo psychosurgery.

Nothing said should suggest that the decision reached in Thomas' case was unsound or that any one of us possessed of the skill, knowledge, and judgment of his distinguished physicians would have arrived at another decision. What is suggested is that the decision to perform innovative surgery was made by physician-experimenters controlled only by their inner ethical and professional standards. Where a considerable element of experimental zeal intrudes, as it must in research involving the conscious brain, this inner control is not enough.

We can generalize from Thomas' case because it is not exceptional, at least not in respect to the patient-subject's ability to consent. If atypical at all, it is in respect to the uncommon effort made by his physicians to secure his agreement. In the general run of psychosurgery decisions there is less patient participation than was seen here. We should not expect to find every psychosurgeon possessed of such ethical sensitivity. Sadly we must recognize that the Marks and Ervins tend to lose theirs. Habits in thinking about tough ethical questions are quickly formed even in the minds of doctor-scientists. Physicians who have once struggled and overcome their doubts find it easier to overcome these doubts a second time. We all do. They will therefore find it easier to persuade their future patients to agree to stereotactic surgery. We all need self-justification for our behavior; what better way to assure ourselves that our prior actions were sound than to repeat them. Psychosurgeons share this need. If this is the way things are, and I believe it is, then control over the decision to perform psychosurgery is not effected by the granting or withholding of approval by patient-subjects.

If patient-subjects do not provide adequate control of experimentation in psychosurgery, neither do hospital review committees. These committees are charged by their institutions to review research proposals or protocols concerning experiments which involve risk of injury to human subjects.⁵¹ The committees, made up of physicians, scientists, and sometimes laymen, must give approval to the investigator before he undertakes his experiment. Approval signifies that the experimental procedures outlined in the protocol satisfy the

51. See Cowan, *Human Experimentation: The Review Process in Practice*, 25 CASE W. RES. L. REV. 533 (1975).

ethical criteria of the committee. Approval may also indicate the design of the experiment is adequate according to scientific criteria. The obstacle that prevents hospital review committees from being effective in protecting against the risks of experimentation in psychosurgery is clear: Proposals requesting approval to perform psychosurgery rarely come to these committees for consideration.

The paradigm of the protocol that receives committee review is the request for approval to test the safety and effectiveness of a new drug. According to this hypothetical protocol, the investigator plans to test his drug using 100 subjects: 25 to receive the new drug; 25 to receive a drug in current use; 25 to receive a placebo; and 25 to receive nothing. He plans to observe and record the results. He also plans to use other sets of 100 subjects with a variety of physical conditions—some sick, some well—to compare and cross-check his results in true scientific fashion. His systematic approach to experimentation dictates that he prepare plans, protocols, or research designs that find their way to review committees. But the psychosurgeon does not approach the decision to experiment in this manner. He tends not to look at each proposed brain operation as one of a predetermined series of 100 or more operations stretching into the future. He deals with each patient as one-of-a-kind. Only after time has passed does he look back to make a patterned evaluation of what he has done. Research in psychosurgery, therefore, is ad hoc and tends not to be systematic the way drug experimentation can be.

Moreover, psychosurgeons do not submit research protocols to review committees for another reason. They simply do not perceive their operations to be experiments. They view them as therapy. Physicians choosing to implant electrodes or perform stereotactic surgery feel they are merely deviating from conventional surgical procedures and do not see themselves as experimenters. They see the patient as ill with a condition that requires specific treatment geared to his particular illness. This need for treatment suggests speed or at least avoidance of cumbersome review procedures. These perceptions of surgeons are supported by habits of a professional lifetime, habits that grant to no one, except a patient and his family, the privilege of participating in their decisions. Viewing themselves to be engaged in therapy, not in experimental research, these physicians seek no formal institutional approval.

Such an approach to surgery is shared to a considerable degree by physician members of review committees. The significance of

this common view is often not appreciated by lay members of the committee, if there are any. In the absence of an incident that focuses institutional attention on psychosurgical research, review committees do not take it upon themselves to invite submission of protocols. These committees cannot be considered a significant factor in protecting individual and social interests against the risks posed by psychosurgery.

Ironically, after a series of stereotactic operations psychosurgeons evaluate their cases and report their findings in professional journals. They describe their past activity as planned research into the functioning of the conscious brain and how the functioning can be modified. The surgeons themselves call their "discoveries" and their techniques "experimental." With candor they share the knowledge acquired from their experiments in modifying behavior. Somehow, the inconsistency of characterizing psychosurgery as therapy at the time it is performed and as experimentation at the time of publication seems to escape them. The inconsistency results from characterizing psychosurgery at either point in time as solely therapy or solely experimentation. It is clearly both. Use of innovative stereotactic techniques to modify the behavior of mentally ill patients would be better viewed as experimental therapy or, turning things around, therapeutic experimentation.

It makes no real difference what one calls it, if there is frank recognition that psychosurgery has this dual aspect. While it is an act of healing, it is also a venture into the unknown, a venture that creates risks of injury to individuals and to society. A decision to encounter these risks should not be made unless an effective element of control is added to the inner controls of psychosurgeons on which we now rely. At present, this element is lacking.

V. CONCLUSION

"What can be done, will be done." This aphorism describes a quite familiar social phenomenon. When science discovers a new principle or technique, society finds a way to apply that principle or put that technique to use. When science creates power, society seemingly cannot resist exercising that power. The phrase explains why discoveries have a way of escaping their discoverers, why they have a tendency to get out of control. It explains why we must be deeply concerned about developments in psychosurgery, developments that have greatly enhanced the power of some men to exercise physical control over the minds of other men. For this power will

most certainly be exercised. Psychosurgery has already been used to treat individuals with mental illness. It will be used to treat social ills such as violence. But must we also fear that the power over men's minds will be the instrument used by governments to eliminate freedom on a grand scale and to usher in the psychocivilized society? Perhaps not. If not, then how do we justify the deep concern felt over psychosurgery?

The answer to this question presents us with a paradox, one that can be stated like this: We may be wrong to fear that psychosurgery will be the primary means used to create a psychocivilized society; yet, we rightly fear the prospect that the state will use psychosurgery to control thought, emotion, and behavior in a psychocivilized society. Understanding this paradox requires that we recognize first, that psychosurgery is a symbol of the ways a society surrenders its freedom to technological and scientific progress, and second, that psychosurgery is a technique that will be used in a society after it has surrendered its freedom. It is dangerous to misunderstand the nature of this paradox and therefore dismiss the threat to society that psychosurgery represents. What follows is a fuller explanation of this paradox and a justification for the concern over psychosurgery that is deeply felt despite the belief it will not be the primary technique used to eliminate freedom.

Psychosurgery does pose a current and real threat to the personal liberties of mentally ill individuals, the human subjects of innovative stereotactic surgery. To be cured of their violent impulses, alcoholism, depressions, and anxieties, individuals undergo operations that may leave them incapable of performing interesting or demanding tasks. They may lose their ability to feel or display emotion. If they are inmates of prisons or mental hospitals, sedative surgical techniques may be used either to manage them while they are institutionalized or to make them harmless when released into society.

But as real and undeniable as is psychosurgery's threat to the personal liberties of mentally ill individuals, there is little likelihood that the new techniques in brain stimulation would be used to control the masses and produce a totalitarian society. Stereotactic surgery requires a team of physicians, elaborate facilities, complicated equipment, and time. For a long while to come, purely psychological techniques will provide more effective control than electrical brain stimulation. Increasingly refined and increasingly familiar psychological methods exist for forming men's attitudes and modifying their behavior. These will be the likely means used to manage the

masses. Furthermore, no dictator would invite the public reaction that would accompany a sweeping psychosurgical assault on his people. But having reached this conclusion, it would be wrong to leave the matter there. For psychosurgery has profound implications for the society that wishes to remain free.

A society insensitive to the techniques used to physically control the mind demonstrates how much, or how little, it values human dignity and freedom. Stereotactic surgery used to cure violence threatens the loss of an individual's capacity to think, remember, reason, love, and fear; in effect, the loss of the very qualities that make him human. A society that accepts this loss shows its readiness to sacrifice a measure of its respect for human dignity. Implanting electrodes to stimulate the brain also involves a decision that a person's mind will be made subject to the will, the control of another. A society that accepts this decision demonstrates its willingness to sacrifice a small but significant measure of its freedom.

If psychosurgery is not itself the threat to freedom in our society, it is the perfect symbol of that threat. Psychosurgical technique symbolizes speed, skill, and efficiency in dealing with human problems. It is characteristic of a society with unlimited faith in science, technology, and the inevitability of social progress. It reflects the spirit of a society that permits technological means to dominate human ends.⁵²

Those of us who fear psychosurgery perhaps do so only because it is unfamiliar. Instead, we should fear the many familiar ways we willingly surrender control of ourselves. In the technological society, we surrender young minds to educational institutions that shape attitudes biased toward skill and know how and away from human values. We deliver ourselves over to television and recreational activity that distract us from attending seriously to our individual and social problems. We give ourselves up to tranquilizers of various kinds that carry us away from the painful, but human, concerns of life. We submit to the constant influence of political and commercial propaganda that creates in us desires for things unnecessary for achieving human purposes, things that in reality are obstacles to achieving human purposes.

In hundreds of ways, we surrender control of our minds to the personal and impersonal forces in our technological society. Familiar psychological techniques reduce our power and will to choose for

52. See generally J. ELLUL, *THE TECHNOLOGICAL SOCIETY* (1964).

ourselves, yet we seem hardly aware they exist. The society that surrenders to psychological control of the minds of its people has good reason to fear the loss of its freedom. If experimentation with the physical control of the mind generates this healthy fear, it is well and good. But one thing seems clear: Psychosurgery might well be a means for control of the mind in a future psychocivilized society; it will not be the means by which that psychocivilized society comes upon us.