STALKING THE MARK OF CAIN

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The Old Testament records that Cain, the first-born son of Adam and Eve, murdered his younger brother Abel in cold blood.[1] As a consequence of this sin, God cursed Cain to live as a "fugitive and a vagabond" forever after.[2] Cain responded to his plight by crying "every one that findeth me shall slay me."[3] The Lord thus proclaimed that "whosoever slayeth Cain, vengeance shall be taken on him sevenfold."[4] God

* Assistant Professor, George Mason University School of Law; Commissioner, United States Sentencing Commission. This essay is a revised version of remarks delivered at the Federalist Society Twentieth Annual Student Symposium on "Is Technology Changing the Law?" at Boalt Hall School of Law, March 9-10, 2001. The views expressed herein are my own. They reflect neither the policy nor the official positions of the United States Sentencing Commission; thus, any errors are attributable solely to me. The controversial nature of these issues goes without saying. To the extent we avoid such discussions, however, we do so at our own peril because the unrelenting pace of technology is forcing policy makers to confront these complicated and morally and emotionally charged issues.

1. "And Cain talked with Abel his brother: and it came to pass, when they were in the field, that Cain rose up against Abel his brother, and slew him." *Genesis* 4:8 (King James).

2. *Id.* at 4:12.

3. *Id.* at 4:14.

4. *Id.* at 4:15.

subsequently set a mark upon Cain, "lest any finding him should kill him."[5] Behavioral psychologists have long sought to pinpoint a similar sort of "mark" in modern day criminals—namely, a genetic or other biological marker that could serve to identify those who may have a propensity to commit violent criminal acts.

Efforts to establish a link between criminal behavior and biological or environmental "causes" are nothing new. Cesare Lombroso, the nineteenth century Italian criminologist, was perhaps the first to argue on an allegedly scientific basis that criminals are born, not made.[6] He drew on the emerging theories of evolution and genetics—as well as the pseudo-science of phrenology—to proclaim that individuals possessing a "criminal mind" might be identified by certain peculiar deformations of their skulls. Although Lombroso's theories did not withstand the test of rigorous analysis, psychiatrists (among others) are revisiting the possibility that certain criminal behaviors may possess a biological origin.

While sociologists have long advanced environmental and other sociological theories (poor nutrition, poverty, racism, etc.) under the rubric of "root causes of crime" to explain criminal behavior,[7] efforts to identify biological causes for explaining this same conduct have long been viewed as taboo.[8] One's environment, or so it has been perceived, is inherently manipulable, thus an individual's circumstances may be altered to effect a change in the individual's behavior. Identification of an environmental "cause" influencing behavior thus does not challenge prevailing orthodoxies that view man largely as a product of external forces. The concern is

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5. *Id.*

6. *See* DEBRA NIEHOFF, THE BIOLOGY OF VIOLENCE 8 (1999). For a description of the intellectual antecedents of Lombroso's work, see GINA LOMBROSO-FERRERO, CRIMINAL MAN: ACCORDING TO THE CLASSIFICATION OF CESARE LOMBROSO (1972).

7. Judge David Bazelon is perhaps the most famous modern exemplar of this position. *See* David L. Bazelon, *The Morality of the Criminal Law*, 49 S. CAL. L. REV. 385, 403 (1976); *see also* MICHAEL TONRY, MALIGN NEGLECT—RACE, CRIME, AND PUNISHMENT IN AMERICA (1994); Michael Tonry, *Racial Disproportion in US Prisons*, 34 BRIT. J. CRIMINOLOGY 97, 112 (Special Issue 1994) (arguing that social deprivation cannot justify an affirmative defense, but that it does warrant informal mitigation at all stages of the criminal justice process).

8. In the early 1990s, critics of biological research into crime were successful in scuttling a National-Institutes-of-Health-sponsored conference entitled "Genetic Factors in Crime: Findings, Uses, and Implications." For a detailed discussion of the controversy surrounding this conference, see NIEHOFF, *supra* note 6, at 3.

that biology, unlike environment, is not quite as easily manipulable (although that notion is itself coming under scrutiny) and thus places the individual at the mercy of her genes. As a result, critics of biological research into human behavior have regarded as suspect any claim that biology forms the basis for behavior.

Nevertheless, with the rise of evolutionary psychology, biological psychiatry, and more sophisticated tools for understanding and mapping basic brain activity, biological theories of human behavior—particularly violent, impulsive conduct—are resurfacing.[9] It is hardly news that the brain has something to do with the way we think and act. Only recently, however, have researchers begun to identify and to understand certain neurochemical and neurophysiological correlates of mentation and behavior.[10] The resulting body of knowledge, though in its own right profound, is nevertheless still far from answering many fundamental questions about the causes of criminal behavior or from providing us with a reliable mark of Cain to ferret out those likely to engage in criminal conduct. The prospect that such findings may be in the offing, however, requires us to grapple with some of the most fundamental principles by which we assess—and ultimately criminalize—certain types of behavior.

In this essay, I hope briefly to raise several of the more fundamental issues raised by this burgeoning understanding of the mechanisms influencing human behavior—specifically, questions surrounding the meaning of criminal intent and the moral justification for imposing punishment. If, for example, we are better able to understand the biological causes for certain types of behavior, will we be forced to modify ideas of freedom and responsibility because the principal functions these notions serve no longer accurately reflect our

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9. *See, e.g.*, MICHAEL GOTTFREDSON & TRAVIS HIRSCHI, A GENERAL THEORY OF CRIME 85-120 (1990); Willard L. Johnson et al., *Impulsive Behavior and Substance Abuse, in* THE IMPULSIVE CLIENT: THEORY, RESEARCH, AND TREATMENT 225-46 (1993); Marcus J. Goldman, *Kleptomania: Making Sense of the Nonsensical*, 148 AM. J. PSYCHIATRY 986, 986 (1991) (defining "kleptomania" as "the irresistible impulse to steal unneeded objects"); *cf.* Howard P. Rome, *Personal Reflections: Impulse Control Disorders*, PSYCHIATRIC ANNALS, Feb. 1992, at 58 (arguing that "loss of control" is a common, "paramount" feature of impulse control disorders).

10. *See, e.g.*, SOLOMON H. SNYDER, DRUGS AND THE BRAIN (1986); Emily R. Grekin et al., *Male Criminals with Organic Brain Syndrome: Two Distinct Types Based on Age at First Arrest*, 158 AM. J. OF PSYCHIATRY 1099 (2001).

understanding of human behavior in light of our discovery of the biological antecedents of decision making? And if we are able to pinpoint behavioral triggers over which we may exercise only the most meager of volitional controls, may we be compelled to rethink our conceptualization of punishment? It is to these questions I will now turn.

I. BIOLOGY AND THE FUNCTION OF THE CRIMINAL LAW

The mere mention of the terms "biology" and "criminal law" within the confines of the same sentence immediately sets off alarm bells in the minds of some commentators. Identifying "biological" bases for criminal behavior raises justified concerns about racism, sexism, and what are perceived as attempts to relegate to the sidelines important environmental factors affecting human behavior.[11] Critics of such research argue that if biology determines behavior, then we are not only wading into a revival of the uglier forms of racism, but we might also be tempted to forgo social efforts to transform decaying neighborhoods, to rebuild impoverished schools, and to rehabilitate destitute individuals. An oft-voiced concern is that if biology figures predominantly in governing behavior, such crucial social reform efforts will be stymied.

While well intentioned, and doubtless cautionary about the errors and injustices of the past, it is my view that these criticisms reflect only part of the overall mosaic of understanding human behavior. The search for biological indicators leading to certain types of criminal behavior is important and something that will occur regardless of efforts to stop it.[12] The debate, oftentimes cast as one of nature versus nurture, has been transformed into how the interaction of nature and nurture may affect human behavior. Indeed, few would express the belief that biology is the sole factor in determining human behavior. Ultimately, the underlying biological basis affecting behavioral development cannot easily be disentangled from environmental factors. The medical community has come to accept that one often breeds the

11. *See* Richard Moran, *Biomedical Research and the Politics of Crime Control: A Historical Perspective, in* 2 CONTEMPORARY CRISES 335-57 (1978).

12. *Cf.* EDWARD O. WILSON, SOCIOBIOLOGY, THE NEW SYNTHESIS (1975); EDWARD O. WILSON, CONSILIENCE (1999).

other.[13] The question is whether human behavior—for my purposes, what society chooses to label as criminal behavior—can be understood as the result of interplay among conscious choice, environmental factors, and basic human biology.

While there are those who scoff at any notion of a biological basis for crime, let us consider two widely-accepted, well-demonstrated factors. First, males commit the overwhelming number of violent crimes the world over.[14] Whether one is reviewing criminological data from Japan, the United States, South Africa, Germany, or Brazil, this same constant holds. Even across these rich and varied cultures, men, and primarily men, are violent. Second, it is widely acknowledged that age plays a significant role in criminality.[15] Men between the ages of sixteen and twenty-five commit the vast majority of violent crimes.

Neither of these "facts" is particularly controversial and both are recognized not only by researchers, but also by individuals engaged in the daily activities of life. When walking down a lonely, dark street in the wee hours of the morning, one generally has a markedly different feeling when confronting a group of young males than young females. Similarly, the presence of a lone male on the street often signals something very different from a male accompanied by a female.

If we are willing to accept these two widely acknowledged notions, then why are we resistant to at least considering that biology, as well as culture, may play a role in the type of behaviors that appear to correspond with criminal conduct? Merely accepting the obvious gender role in criminality suggests that biology necessarily plays some part in criminality—even if it is biology as played out in the larger context of environmental influences. But the behavioral roots of

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13. Social experience and individual personal development may trigger the expression of genes that are not otherwise realized. The interaction among the organism, the environment, and the organism's inherited traits establish diverse responses, which make one organism unique from another. *See* Benson E. Ginsburg, *Ontogeny, Social Experience, and Serotonergic Functioning, in* THE NEUROTRANSMITTER REVOLUTION: SEROTONIN, SOCIAL BEHAVIOR AND THE LAW (Roger D. Masters & Michael T. McGuire eds., 1994).

14. *See, e.g.*, MICHAEL P. GHIGLIERI, THE DARK SIDE OF MAN: TRACING THE ORIGINS OF MALE VIOLENCE (1999); JAMES Q. WILSON & RICHARD J. HERRNSTEIN, CRIME & HUMAN NATURE 104-25 (1985); RICHARD WRANGHAM & DALE PETERSON, DEMONIC MALES: APES AND THE ORIGINS OF HUMAN VIOLENCE (1996).

15. *See* WILSON & HERRNSTEIN, *supra* note 14, at 126-47.

violence may run even more deeply than mere gender. Recent studies of the behavior of twins in North America, England, and Japan have demonstrated that where an identical twin is a juvenile delinquent, there is a ninety-one percent chance his twin will be as well.[16] For fraternal twins, however, that correlation is only seventy-three percent, and it is even less significant for non-twin siblings. While studies of this sort are hardly conclusive, they at least suggest that we ought to pay attention to environment *and* biology in understanding certain types of criminal behavior.

Behavioral studies aside, many of us have witnessed the devastating effects of depression, drug or alcohol abuse, mental illness, or senile dementia in our own families. It is not particularly uncommon for a family to witness the profound personality changes that an elderly relative may undergo during the onset of Alzheimer's disease. Similarly, families must work through the personality changes that often occur in a drug-addicted teenager or an alcoholic relative. In our normal family lives, we are often witness to the effects of illness, disease, and drug addiction on the behaviors and personalities of those whom we love. If we can accept, and seek to understand these more common-place problems, should we then turn a blind eye to the possibility that neurobiological factors may influence other sorts of behavior as well?

II. RECONSIDERING CRIMINAL INTENT?

The principal difference between the criminal law and the civil law is the notion of mens rea—the criminal, or guilty, mind.[17] The question of the perpetrator's mental state is fundamental to virtually every *malum in se* crime that society chooses to punish.[18] The historical roots of a mens rea

16. *See* DEAN HAMER & PETER COPELAND, LIVING WITH OUR GENES 100 (1998).

17. Saint Augustine may have been the first to employ the term *mens rea* to capture the notion that the moral content of behavior cannot be assessed without attention to inner states: "The evil motive makes the act evil; the good motive makes the act good." Albert Levitt, *The Origin of the Doctrine of Mens Rea*, 17 ILL. L. REV. 117, 117 n.1, 130-31 (1922).

18. Francis E. Sayre has provided a careful treatment of mens rea in the legal context. *See* Francis E. Sayre, *Mens Rea*, 45 HARV. L. REV. 974 (1932) [hereinafter Sayre, *Mens Rea*]; Francis E. Sayre, *The Present Signification of Mens Rea in the Criminal Law*, *in* HARVARD LEGAL ESSAYS 399 (1934) [hereinafter Sayre, *Mens Rea in the Criminal Law*]. Professor Sayre's classic work has opened the door for further exploration of the subject. *See, e.g.*, PETER BRETT, AN INQUIRY INTO CRIMINAL

component in establishing criminal liability run deep and extend to the earliest known legal systems. Ancient Hebraic law, for example, drew a clear distinction between a person who kills another intentionally and one who kills not by "lying in wait" for his victim, but instead by having "God deliver him into his hand."[19] Building upon these ancient precepts, English legal tradition established the idea that criminal liability entails some conscious mental activity on the part of the offender relating to the proscribed conduct. In other words, the offender had to make a conscious choice to engage in the unlawful activity. Thus, by the time of Coke, the maxim "*actus non facit reum nisi mens sit rea*" ("an act does not make one guilty unless his mind is guilty")[20] had become well ingrained in the common law. It remains a cornerstone of modern Anglo-American criminal jurisprudence.[21]

A. The Problem of Choice

The question of conscious choice, however, stands as a fascinating, and infuriatingly complex, issue. While we have a conventional, person-on-the-street understanding of choice and what it means to choose (rationally or otherwise) a particular

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GUILT 81-176 (1963); JEROME HALL, GENERAL PRINCIPLES OF CRIMINAL LAW 70-211 (2d ed. 1960); H.L.A. HART, PUNISHMENT AND RESPONSIBILITY 28-53, 113-237 (1968); HERBERT L. PACKER, THE LIMITS ON THE CRIMINAL SANCTION 103-35 (1968); PAUL H. ROBINSON, 1 CRIMINAL LAW DEFENSES §§ 21-28 (1984).

19. *Exodus* 21:12-14 (King James). Albert Levitt provides an interesting account of the various circumstances in which the mental state determines the quantum and type of punishment meted out to offenders under Old Testament law. *See* Levitt, *supra* note 17, at 123-27.

20. EDWARD COKE, THIRD PART OF THE INSTITUTES OF THE LAWS OF ENGLAD 107 (Garland Publishing 1979) (1644).

21. *See* RICHARD G. SINGER & MARTIN R. GARDNER, CRIMES AND PUNISHMENT: CASES, MATERIALS AND READINGS IN CRIMINAL LAW 213 (1989) ("For well over five hundred years, [this] maxim has guided criminal law . . . ."). Commenting on the persistence of the mens rea requirement in modern law, the Supreme Court of the United States stated:

> The contention that an injury can amount to a crime only when inflicted by intention [or some other culpable state of mind] is no provincial or transient notion. It is as universal and persistent in mature systems of law as belief in freedom of the human will and a consequent ability and duty of the normal individual to choose between good and evil. A relation between some mental element and punishment for a harmful act is almost as instinctive as the child's familiar exculpatory "But I didn't mean to." . . . Unqualified acceptance of this doctrine by English common law . . . was indicated by Blackstone's sweeping statement that to constitute any crime there must first be a "vicious will."

Morissette v. United States, 342 U.S. 246, 250-51 (1952) (footnotes omitted).

course of conduct,[22] the philosophical debates on the existence of free will and its correlate of free choice (defined as the absence of compulsion other than will) extend back to the ancient philosophers. Distinctions are commonly made between external compulsion (I hold a gun to your head and force you to do something you otherwise would refuse to do) and internal compulsion (I have advanced Alzheimer's and as a result engage in behavior that but for the illness I would not otherwise do).[23] The classic tradition of criminal law theory holds that human actions, as opposed to mere bodily movements (nonacts), are distinguished by the presence of volitions that precede and cause the former but that are absent in the latter.[24] An act for purposes of assessing criminal culpability thus entails a voluntary act, a conscious choice to engage in the prohibited conduct.[25] The Model Penal Code's

22. *See, e.g.*, Stephen J. Morse, *Culpability and Control*, 142 U. PA. L. REV. 1587, 1611 (1994).

23. *See id.* at 1619-21.

24. *See* JOHN AUSTIN, LECTURES ON JURISPUDENCE 201-04 (R. Campbell ed., 1920) (1861). The classic Austinian theory of action has given rise to considerable debate both for its alleged failure to account adequately for involuntary omissions and for its employment of the supposed fiction that mental events are causally related to actions. *See* HART, *supra* note 18, at 99-101. Such accounts of action are routinely condemned as manifestations of the myth of the out-dated Cartesian dualistic interactionism between the immaterial "mind" and the material "body." *See* BRETT, *supra* note 18, at 46-50; GILBERT RYLE, THE CONCEPT OF MIND 15-16, 63-69 (1969). Murphy, however, defends a variety of the classic theory: "An act or omission is involuntary if and only if the behavior or the failure in question is explainable by factors which causally prevent the exercise of normal capacities of control or eliminate such capacities entirely." Jeffrie G. Murphy, *Involuntary Acts and Criminal Liability*, 81 ETHICS 332, 340 (1971).

25. H.L.A. Hart, for instance, explains:

> [B]esides the elements of knowledge of circumstances and foresight of consequences, in terms of which many writers define mens rea, there is another 'mental' or at least psychological element which is required for responsibility: the accused's 'conduct' (including his omissions where these are criminally punishable) must, so it is said, be voluntary and not involuntary. This element in responsibility is more fundamental than mens rea in the sense of knowledge of circumstances or foresight of consequences; for even where mens rea in that sense is not required and responsibility is 'strict' or 'absolute' . . . this element, according to some modern writers, is still required.

HART, *supra* note 18, at 90. Jeffrie Murphy offers another formulation of a similar view:

> Human actions may misfire or reveal defects in a variety of ways. They may be done in ignorance, accidentally, compulsively, or under duress. And when we note the presence of such qualifications, our tendency is to mitigate the agent's responsibility for the action or to excuse its performance entirely [because of absence of mens rea.] But when actions misfire in some even more basic way (as a result of an epileptic seizure,

drafters acknowledged this conscious-unconscious act distinction by defining involuntary acts rather than trying to assign a meaning to voluntary action.[26]

The rise of neurobiology and evolutionary psychology has recast those debates to some extent, differentiating those acts that are internally caused from those externally caused. Autonomy is thus unbound from the traditional notion of free will and is transformed into a notion that encompasses anything that is internally derived. Behavior that is "chosen" in the classical sense is thus melded together with behavior that is "determined" by one's biological make-up. Under this scenario, however, no external forces are at work on the individual; thus, the behavior is self-determined. As Dr. Eric Kandel has explained, "[t]he central tenet of modern neural science is that all behavior is a reflection of brain function."[27] A corollary to this dogma is that while healthy brain function will produce healthy actions, an unhealthy brain will yield unhealthy activities. Because the brain is integral to the individual, behavior that is the result of brain function is, under the reconstructed definition of free will, self-chosen behavior.

The early Hollywood takes on Mary Shelly's justly famous novel *Frankenstein* serve to illuminate precisely this point.[28] Igor, while procuring a brain for Dr. Frankenstein to insert into his creation, accidentally destroys the healthy brain and instead happens upon the brain of one who was executed for acts

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say) we are tempted not just to mitigate or excuse, but to say that no true human action has been performed at all. We appear to be confronted with nothing more than an event or a mere happening, and talk of excuse here seems to make no more sense than would talk of excusing a rock for falling on one's head. Such basic pathologies are said, in the criminal law, to result in involuntary acts or omissions and to thus fail to satisfy the law's minimal condition for liability—the requirement of an actus reus.

Murphy, *supra* note 24, at 332.

26. The Model Penal Code provides:

The following are not voluntary acts within the meaning of this Section:

(a) a reflex or convulsion;
(b) a bodily movement during unconsciousness or sleep;
(c) conduct during hypnosis or resulting from hypnotic suggestion;
(d) a bodily movement that otherwise is not a product of the effort or determination of the actor, either conscious or habitual.

MODEL PENAL CODE § 2.01(a) (1985).

27. Eric R. Kandel, *Brain and Behavior, in* PRINCIPLES OF NEURAL SCIENCE 5-17 (Eric R. Kandel et al. eds., 1991).

28. MARY SHELLY, FRANKENSTEIN, OR, THE MODERN PROMETHEUS (1818).

related to his "criminal insanity." Dr. Frankenstein unwittingly places this "diseased" brain into the poor creature's body with disastrous results. The unfortunate creation acts in accordance with that which he has received: a criminal brain.

Although we are able to accept this interesting (and imaginary) cause-effect relationship between the "criminal brain" and the rampaging monster, we are less inclined to accept it in the world in which we must live. Dr. Kandel's observation may reflect the opinion of neuroscientists, but it may not necessarily reflect the conviction of legal academics, practitioners, or policy-makers. Despite significant advances in understanding brain structure and function, which has in turn fueled deeper recognition of the neural mechanisms underlying behavior, there is great reluctance to include neuroscience in the public debate regarding violence. Underlying the reluctance of many to accept that biology—beyond gender and age—plays any role in contributing to criminal behavior is our refusal to abandon the notion of free will, which serves such an important function in the American criminal justice system. The modern conflict between behavioral science and political ideology continues to create a great deal of fear and apprehension on both sides of the divide.

The difficulty is whether, once the biology of the mind is better understood, the legal process will be able to differentiate between individuals who truly are "unable to choose" in the conventional sense and those who are able to exercise free agency. Henry Bracton, fittingly a cleric as well as a judge, served as the American Law Institute of his day in producing a treatise that became both an immensely influential argument for what the law should be as well as a restatement of what it was at the time in which he wrote. With respect to *mens rea*, Bracton argued, "[i]t is will and purpose which mark *maleficia*" and "a crime is not committed unless the intention to injure exists."[29] This focus on intent as a necessary predicate for establishing criminal liability carries over from Bracton's time to the present day.

Bracton thus excused infants from criminal liability because their "designs" are "innocent." He similarly excluded

29. HENRY D. BRACTON, 2 ON THE LAWS AND CUSTOMS OF ENGLAND 384 (Samuel E. Thorne trans., Harvard Univ. Press 1968) (1250).

"madmen" because they "lack reason" in committing their criminal acts.[30] Bracton's treatment of these special categories suggests that *mens rea* required that offenders function as moral agents who rationally choose their evil designs. Exculpation appears premised not merely on a failure to intend the act, but, as with the examples of children and the palpably insane, also upon the actor's *inability* to make rational choices between good and evil. Traditionally, those believed incapable of rational choice were relieved of criminal responsibility.

If behavior is governed in large part by biological forces over which we may effect only limited control, then under the traditional Bractonian model, an individual who engages in criminal acts because of his biological make-up cannot be held criminally liable. If we can exclude from criminal culpability those unable rationally to choose, and we now find that a significant number of criminals are internally compelled to commit anti-social acts (an important but not necessarily correct assumption), the question now may be, as the critics of biological determinism fear, whether we can ever hold anyone responsible for his actions. A similar concern is that, if we deny man his ability to chose and refuse to hold him responsible for his choices, we may ultimately compromise that which makes us uniquely human.

B. The Question of Causation

It is vital to understand the nature of causation in the context of biological determinism. Much of the discussion regarding the biological causes of criminal behavior takes it for granted that certain neurobiological (or other physiological) characteristics will necessarily result in certain, predictable, types of behaviors. This marks a significant assumption. It is quite difficult to identify and establish a causal link between biology and action. Any given behavior can have a variety of presumptive causes, and any given cause can give rise to many different types of behavior. Recently, for example, the news media reported the tragic story of a mother who took the lives of her five young children.[31] Although the details of this

30. *See* Sayre, *Mens Rea*, *supra* note 18, at 985-86.

31. Lee Hancock, *Yates Believes 'Devil' is in Her, Sibling Says*, THE DALLAS MORNING NEWS, June 30, 2001, at A1; Lee Hancock and Laura Heinauer, *Mother*

horrible event have yet to unfold, it is likely that some sort of temporary insanity defense will be raised, apparently as a result of what is alleged to be severe post-partum depression. Talk shows soon were abuzz with individuals discussing the vicissitudes of this psychological malady. The ultimate legal question to be answered, however, is whether such a condition (if she indeed exhibits it) "caused" her behavior. After all, it is plain that she evinced a will to kill her children. The question is whether she suffered from a mental abnormality that either affected her ability to reason, or allowed her to construct a gross misperception of reality. Did the illness cause the behavior, exist as a separate correlate, or merely contribute to it in some small way, so that had she chosen differently, she would not have completed the heinous acts?

In an interesting example of effects in search of causes, Dr. Frederick Goodwin, a biological psychiatrist, published a study of U.S. Marines receiving psychiatric discharges in an effort to determine whether they shared something neurobiologically in common.[32] Goodwin tapped the Marines' spinal fluids to see if he could discern any neurologically identifiable patterns. He discovered that the discharged Marines each displayed one significant feature in common; all had low levels of the neurotransmitter serotonin—a chemical neurobiologists had long suspected as being able to influence one's ability to control behavior. Researchers had discovered decreased levels of this same neurotransmitter in a broad range of other violent people, including prisoners convicted of committing aggressive, impulsive acts, children who had tortured animals, and men who had scored unusually high on psychological exams for aggression, hostility, or psychopathic deviance. Goodwin hypothesized that the low serotonin levels handicapped the Marines' ability to control their impulsive tendencies. Once these intriguing patterns were noticed in humans, scientists began to manipulate serotonin levels in laboratory animals and found that decreased levels of serotonin apparently result in a tendency to be highly aggressive. The link between serotonin levels and behavior thus seems undeniable.[33]

Charged in Deaths of 5, THE DALLAS MORNING NEWS, June 21, 2001, at A1, A10.

32. *See* HAMER & COPELAND, *supra* note 16, at 102-06.

33. The study of human behavior is ultimately the study of animal behavior. As a consequence, the same tools that researchers routinely use to study animal behavior can be adapted to studying human behavior. Professor E. Donald Elliot,

While we may understand the function of serotonin in neurobiology, it is a major step to say that decreased levels of serotonin necessarily caused the behavior for which any of the former Marines were discharged from service or that the decreased serotonin levels predated the unbecoming behavior. In an interesting example of how this area can be almost infuriatingly complicated, researchers have also observed that non-surgically or chemically engineered monkeys could nevertheless have their serotonin levels increased or decreased merely by manipulating their rank order in the pack.[34] Based upon this research, it appears that environmental factors can themselves affect brain biochemistry.

To substantiate this hypothesis of the effects of environmental manipulation on serotonin levels, Raleigh and McGuire subsequently tested college fraternity brothers, discovering that fraternity leaders had higher serotonin levels than recent pledges.[35] This was a result that mirrored the studies involving monkeys,[36] buttressing the notion that social hierarchy may itself have an effect on neurobiology. Thus social experience, individual health, and developmental factors may each affect serotonin function. It therefore remains an open and worthwhile question whether the problems experienced by Goodwin's Marines were the result of an innate disability that marked them for military failure or were merely a function of the environmental affects of being in the military.

C. Cause and Culpability

What do these intriguing studies mean with respect to criminal intent? As a practical matter, the common law has virtually always recognized some sort of insanity defense to criminal culpability. Whether it is the classic *M'Naghten* test or

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a pioneer in analyzing the intersection of law and biology, has made the identical point, albeit in a slightly different context. *See* E. Donald Elliott, *Law and Biology: The New Synthesis?*, 41 ST. LOUIS U. L.J. 595 (1997).

34. Michael J. Raleigh & Michael T. McGuire, *Serotonin, Aggression, and Violence in Vervet Monkeys, in* THE NEUROTRANSMITTER REVOLUTION: SEROTONIN, SOCIAL BEHAVIOR AND THE LAW, *supra* note 13, at 129, 129-45.

35. This study is discussed in HAMER & COPELAND, *supra* note 16, at 105-06.

36. *See* Raleigh & McGuire, *supra* note 34, at 129-45; *see also* Michael J. Raleigh & Michael T. McGuire, *Biodirectional Relationships Between Typtophan and Social Behavior in Vervet Monkeys*, ADVANCES IN EXPERIMENTAL MEDICINE AND BIOLOGY 294, 289-98 (1991).

an "irresistible impulse" standard,[37] society routinely excuses certain individuals from criminal responsibility. If someone has low serotonin levels as a result of genetic defect or unavoidable social ordering, is criminal culpability the same as if the illegal activity were willfully chosen?

The answer to this question is not altogether obvious. A traditional *mens rea* defense would entail offering proof that the criminal act was not intended or that, if intentionally committed, it was the product of a defective will. It may be argued that an individual suffering from a biological defect affecting volitional control could not form the intent requisite to assign criminal liability. Such a case would appear to fall within the standard rationale for excusing certain criminal behavior on the basis of "insanity" or "irresistible impulse." Cases of this sort seem to fit neatly within existing categories for legal insanity.

On the other hand, knowledge about genetic predispositions—far from mitigating blameworthiness—may also lead to *increased* culpability for those who know they are susceptible to certain types of behaviors. A simple illustration of this point is the law's handling of drunk drivers. Although no one reasonably believes that most drunk drivers intend to kill people, society nevertheless holds them criminally responsible for becoming drunk and placing themselves behind the wheel of an automobile. John Stuart Mill cogently argued on behalf of increased culpability for one who knows that drink does not agree with him, decides to imbibe, and then commits an otherwise unintentional crime:

> The right inherent in society to ward off crimes against itself by antecedent precautions suggests the obvious limitations to the maxim that purely self-regarding misconduct cannot properly be meddled with in the way of prevention or punishment. Drunkenness, for example, in ordinary cases, is not a fit subject for legislative interference, but I should deem it perfectly legitimate that a person, who had once been convicted of any act of violence to others under the influence of drink should be placed under a special legal restriction, personal to himself; that if he were afterwards found drunk, he should be liable to a penalty, and that if when in that state he committed another offense, the

37. *See* discussion *infra* Part II.D.

> punishment to which he would be liable for that other offense should be increased in severity. The making himself drunk, in a person whom drunkenness excites to do harm to others, is a crime against others.[38]

The individual who is forewarned that he may have a problem with alcohol thus may have increased, not decreased, responsibility for her actions. Similarly, one who knows of a genetic anomaly which may lead to antisocial conduct may bear the burden of seeking treatment or restricting her own activities. The woman suffering from a known seizure disorder who disguises her condition in order to obtain a driver's license must bear the consequences of any unintended, but nevertheless foreseeable, harmful actions.

As these examples suggest, recent discoveries may sometimes relieve individuals of criminal culpability while conversely making other forewarned offenders even more culpable. The existence of impairment in the ability to distinguish between right and wrong, not the lack of an impairment leading to a propensity for behavior, is what matters for establishing legal culpability. If the identified physical condition is not connected with the inability properly to reason, it should presumably have no effect on whether the individual is determined legally responsible.

D. Wither the Insanity Defense?

Where might the traditional insanity defense fit within this unfolding matrix? Society has long been ambivalent about the line between malice and mental illness. We can usually recognize the person who is classically "insane" and completely unable to control his behavior. Those are the easy cases. Seemingly sane individuals who are nevertheless unable to control their violent, impulsive behavior are much more difficult to categorize. The insanity defense demands a rigorous definition of insanity if it is to be a useful concept. Indeed, while the term "insanity" is common in the legal literature, it has no real medical definition as such.

English courts, not members of the medical profession, established the prevailing legal standard for the definition of

38. JOHN STUART MILL, ON LIBERTY 118-19 (Edward Alexander ed., Broadview Press 1999) (1859).

insanity. Daniel M'Naghten, the disinherited son of a Glasgow woodturner, was acquitted in 1943 of murdering a secretary to then Prime Minister Sir Robert Peel on the grounds that his reasoning abilities had deteriorated to the point where he was no longer capable of understanding "the nature and quality of the act he was doing, or, if he did know it . . . he did not know he was doing what was wrong."[39] At the time of his arrest, M'Naghten explained that:

> The Tories in my native city have compelled me to do this. They follow and persecute me wherever I go, and have entirely destroyed my peace of mind. They followed me to France, into Scotland, and all over England; in fact, they follow me wherever I go . . . .[40]

Not unlike John Hinckley's acquittal some 140 years later,[41] M'Naghten's escape from the gallows provoked a public outcry. In response, the House of Lords demanded that the judiciary clarify the rules governing the establishment of legal insanity. From those inauspicious beginnings, the modern insanity defense was born. The American judicial system eventually adopted this "knowledge of right from wrong" maxim as the principal test for determining legal insanity.

This legal definition, however, is not only at odds with a medical understanding of what it means to have an impaired ability to reason or exercise control, but it has also undergone various alterations over time. The "irresistible impulse" test—an extension of M'Naghten—soon became fashionable, as well as defenses related to "homicidal mania" and "temporary insanity," concepts that were largely bereft of medical definition. Eventually, the evolving understanding of mental illness gave rise to a connecting of medical and legal standards for insanity. In the controversial 1954 decision *Durham v. United States*, Judge David Bazelon effectively struck down the M'Naghten test and instead substituted a new standard for assessing insanity that he believed better reflected then-

39. LAWRENCE M. FRIEDMAN, CRIME AND PUNISHMENT IN AMERICAN HISTORY 143 (1993).

40. NIGEL WALKER, 1 CRIME AND INSANITY IN ENGLAND, THE HISTORICAL PERSPECTIVE 91 (1968). M'Naghten's statements are discussed in MARTIN DALY & MARGO WILSON, HOMICIDE 261-64 (1988).

41. *See infra* Part III.A.

prevailing medical views of mental illness.[42] The test he created, an attempt to knit together contemporary medical knowledge with emerging legal standards, permitted an individual to be excused from criminal culpability if his illegal act was the result of a "mental disease or defect."[43] While heralded as a more humane and medically-grounded way in which to treat the concept of "insanity," the efforts to establish causation proved elusive.

At roughly the same time as the *Durham* rule was articulated, the American Law Institute (ALI) proposed a model penal code that had significant influence over state and federal law. Under the ALI test, the insane criminal had to lack either "substantial capacity to appreciate the criminality of his conduct" or "substantial capacity . . . to conform his conduct to the requirements of the law."[44] This latter criterion represents an attempt to distinguish non-culpable acts of compulsion from blameworthy acts of agency. Psychiatrists, however, proved no better able to determine the defendant's "substantial capacity to conform" than they were at determining the defendant's knowledge of wrongfulness.

The *Durham* rule gave rise to a renewed debate about the role of mental illness in relation to criminality. The traditional nomenclature of "immoral" and "evil" gave way to the value-neutral, medical terms of "mentally ill," "diseased," or "psychotic" as a way of describing criminal behavior. Despite a brief surge in the invocation of "insanity" as a defense to criminal charges following the *Durham* rule's adoption, the public was erroneously led to believe that scores of criminals were being acquitted as a result of their alleged mental aberrations. In fact, insanity defenses represent only a small fraction of the types of defenses raised. The public, however, well-acquainted with the old concepts of mental illness, and apparently skeptical of inflated claims of "causation" between mental illness and subsequent criminal acts, refused to digest the *Durham* rule. In the wake of the acquittal of John Hinckley, President Reagan's attempted assassin, the legal tide turned against *Durham* and the *M'Naghten* rule came back into vogue.

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42. 214 F.2d 862 (D.C. Cir. 1954).
43. *Id.* at 875.
44. MODEL PENAL CODE § 4.01(1) (Proposed Official Draft 1962).

In the years since the Hinckley case exploded into the public consciousness, American psychiatrists have generally explained that testimony about whether a defendant understood the wrongfulness of his acts "is more reliable and has a stronger scientific basis" than psychiatric testimony about whether he was capable of conforming his behavior to legal dictates.[45] Despite the popular view that the insanity defense routinely enables hardened, violent criminals to return to the streets, recent studies show that fewer than 1% of defendants facing felony indictments avail themselves of the insanity defense.[46] Of these, no more than one-quarter are ever successful.[47] Regardless of the reality of the situation, the popular perception has created the attitude among the public that biological investigations of criminality ultimately favor the criminals at the expense of the victims and the public. As a consequence, biologically-based research into criminal behavior has not only fueled the fear of those in the academic world who are convinced that such investigations are a cover for racism and eugenics, but it has raised the public's ire as well. Insanity remains a relevant defense in certain cases, but as understanding of mental illness and neurobiology increases, it may well be profoundly altered—hopefully to adopt a more medically-grounded basis.

III. ON PUNISHMENT AND THE THERAPEUTIC STATE

The insanity defense is a means of preventing the allegedly insane individual from being punished as a consequence of his non-intended (albeit criminal) actions. This legal construct highlights the link between the conscious criminal act and the resultant punishment. At its most fundamental level, the issue of intent is the moral issue of blameworthiness. Essentially, the party who intended to bring about the harm ought to be punished for his misdeeds. He should not have committed the wrongful act, hence he is responsible for the act's consequences.

Criminal law is based in part on this notion of revenge.

45. Phillip E. Johnson, *The Turnabout in the Insanity Defense*, *in* 6 CRIME AND JUSTICE: AN ANNUAL REVIEW OF RESEARCH 221, 221-36 (Michael Tonry & Norval Morris eds., 1985).

46. These studies are discussed in NIEHOFF, *supra* note 6, at 28.

47. *See id.*

Anthropologists assume that early tribal law was founded on the aptly named "blood feud," wherein justice of the vengeance sort was reposed in the hands of the kinship group.[48] With the emergence of larger social orders, however, the state began to replace the myriad tribal systems and enforce common legal norms.[49] At this point, criminal law came to be distinguished from tort law, which involved a private wrong that demanded compensation. A criminal infraction came to be understood as a public wrong against society for which punishment—not recompense—was demanded.

The establishment of the "criminal act yields punishment" formula mirrors the ancient philosophical debate concerning the moral justification for imposing punishment upon the individual. In the modern state, retributivist and utilitarian theories of punishment tend to dominate the political landscape. In at least one sense, all punishment is retributive in that it is inflicted as the consequence of an anti-social act. Although utilitarian rationales vary widely, their central tenet is that punishment is justified by net positive consequences to society. The infliction of suffering upon the wrongdoer may itself be evil, but it is nevertheless warranted because it may prevent the offender from repeating his conduct and may deter others from doing likewise. For most utilitarians, retribution for its own sake is both inefficient and barbaric. Retributivists, however, argue that utilitarianism may justify excessive punishment for minor infractions and may permit punishment of the innocent. Punishment can only be considered just when—in the Kantian sense—it is a good in itself rather than a mere means to a further end. And it is a good in and of itself only when the guilty receive their just deserts.

Punishment, then, is inexorably intertwined with the degree of culpability.[50] As a result, modern criminal law is, in effect, a codification of this popular sentiment: a first degree murderer, one who premeditates and plainly intends to kill his victim, is

48. Clarence R. Jeffery, *The Development of Crime in Early English Society*, 47 J. CRIM. L. CRIMINOLOGY & POLICE SCI. 647, 654-55 (1957); Martin R. Gardner, *The Mens Rea Enigma: Observations on the Role of Motive in the Criminal Law Past and Present*, 1993 UTAH L. REV. 635, 644-47.

49. *See* Jeffery, *supra* note 48, at 655-59.

50. *See* HART, *supra* note 18, at 152-54 (arguing that it is just to punish negligence only if the defendant was capable of behaving reasonably).

punished more severely than the individual who merely commits manslaughter, which is often expressly defined as an unintentional killing. The defenses to criminal culpability often revolve around an attempt to disprove or mitigate intent. For example, the universally recognized defenses of infancy, insanity, and duress each negates the defendant's *mens rea.* These defenses can be traced to Bracton's theory of *mens rea,* which required evil motivation or capacity for moral wrongdoing. The essential thrust of these defenses has remained largely static over time. Punishment is unjust when inflicted on persons unable to function as moral agents or persons who act without evil motivation. Even though such a person may "intend" to engage in conduct proscribed by the law, or may even possess the *mens rea* element specified by the offense definition, he may lack general blameworthiness and thus should not face punishment.

A. Reconceptualizing Punishment

What might punishment mean in a world in which all mentation is explained by biological impulse? Under the classic theory underpinning criminal law, punishment should be reserved for those who deserve it by virtue of their conscious malfeasance. Despite occasional utilitarian nods to the contrary, that tenet has withstood the test of time and common consensus. Our ever-increasing understanding of human behavior may ultimately lead society to expand the number of individuals who should be legally excused for their otherwise criminal conduct. Such an understanding, however, does not necessarily translate to liberty for the malefactor.

As an illustration, science can point to at least one individual, the famous Inmate X from Holland who has the only known gene linked directly to violent behavior in humans. Inmate X makes for an extraordinarily disturbing, yet fascinating case study.[51] After a troubled history of violent, impulsive conduct,

51. *See* H.G. Brunner et al., *Abnormal Behavior Associated with a Point Mutation in the Structural Gene for Monoamine Oxidase A,* 262 SCIENCE 578, 578-80 (1993) [hereinafter Brunner et al., *Abnormal*]; H.G. Brunner et al., *X-Linked Borderline Mental Retardation with Prominent Behavioral Disturbance: Phenotype, Genetic Localization, and Evidence for Disturbed Monoamine Metabolism,* 52 AM. J. HUM. GENETICS 1032, 1032-39 (1993) [hereinafter Brunner et al., *X-Linked*]; *see also* WILLIAM WRIGHT, BORN THAT WAY: GENES, BEHAVIOR, PERSONALITY 149-50 (1998) (discussing Brunner's case study of Inmate X).

Inmate X was only twenty-three years old when he was convicted of raping his sister. Although he was generally deemed a model inmate in terms of his comportment while in prison, on one occasion he stabbed a guard in the chest with a pitchfork when told to work harder on a prison detail. This violent outburst appeared uncharacteristic, as he was otherwise cooperative with prison authorities. Misconduct seemed to only occur in episodic outbursts.

A female relative of Inmate X visited a physician and explained that she wanted her children genetically tested because she believed her violent relative's behavior was not an anomaly, but in fact a long-standing deviant behavioral trait within her family. Intrigued by the woman's suggestion, the doctor agreed to pursue a study of the family. In all, eight men in the family had demonstrated repeated sexual misconduct and other violent, impulsive outbursts. It was discovered that problems of this sort extended back some five generations in the family ancestral tree. Interestingly, a number of the male family members not only seemed to exhibit violent behavior and overt sexual aggression, but were also plagued by mild mental retardation.

A Dutch geneticist, Dr. Hans Brunner, engaged in a painstaking genetic analysis of the male members of the family to determine whether any identifiable abnormalities could be discerned.[52] His careful labor paid off. He discovered that each of the afflicted family members, all blood-related males, had an odd mutation in the monoamine oxidase A gene. The gene affects the production of an enzyme that normally regulates serotonin; unfortunately, due to the mutation this enzyme was rendered effectively non-functional. Brunner showed that Inmate X and his troubled male family members each had the same odd genetic mutation, but that the twelve healthy male family members did not. In light of the understanding that serotonin is a key to regulating impulse control, it was assumed that this genetic defect prevented Inmate X and his similarly afflicted male relatives from controlling their impulsive behavior. Such a failure resulted in the commission of violent criminal acts.

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52. *See* Brunner et al., *Abnormal, supra* note 51, at 578-80; Brunner et al., *X-Linked, supra* note 51, at 1032-39.

Fortunately, this mutation has proven to be quite rare and therefore cannot begin to be considered a culprit for violent behavior the world over. Nevertheless, it may be considered an example of how genetics can play a role in behavior regulation. Doubtless there are new discoveries lurking just over the horizon. But the question remains whether or not Inmate X deserves punishment for his crimes. If the appropriate causal link between the genetic abnormality and the criminal actions could be established, the answer to this question would appear to be no. As a practical matter, however, the solution is not quite as simple as that. Even if society might not want to punish Inmate X, it may nevertheless elect to prevent an individual suffering from impulse control problems to live an unsupervised life.

Such is the case with the notorious John Hinckley, Jr., President Reagan's would-be assassin.[53] In order to show that Hinckley was deserving of punishment rather than medical treatment, the government sought to show that Hinckley could distinguish right from wrong at the time he attempted to kill the President. Prosecutors argued this was evident because he had written to actress Jody Foster, purchased a gun, and stalked President Reagan for several months. To rebut the government's evidence, the defense raised an insanity defense and attempted to show that Hinckley was schizophrenic or suffered from a borderline personality disorder. As part of that defense, Hinckley's lawyers endeavored to call as a witness Dr. David Bear, a biological psychiatrist from Harvard University Medical School. Dr. Bear sought to introduce at trial a CAT scan taken of Hinckley's brain at Duke University Medical School where Hinckley had been sent for a psychiatric examination. The CAT scan revealed that not only were the ventricles of Hinckley's brain abnormally enlarged, but also that certain portions of the brain itself were "missing." Dr. Bear wanted to introduce this evidence as part of his testimony and to explain to the jury that these demonstrable organic brain anomalies prevented Hinckley from acting rationally. After the government's objection, however, the judge ruled the CAT scan

53. The factual discussion of the Hinckley case in this paragraph is taken from LINCOLN CAPLAN, THE INSANITY DEFENSE AND THE TRIAL OF JOHN W. HINCKLEY, JR. (1984).

inadmissible. Dr. Bear then refused to appear as an expert witness unless he could show to the jury the basis for his scientific opinion. The judge subsequently allowed the CAT scan to be introduced, and Bear testified. Hinckley was later acquitted on the basis of his claimed insanity.

Provided that Bear's testimony was accurate, and that his medical conclusions were sound, it would be odd to "punish" someone like Hinckley. Punishment would neither prevent Hinckley from engaging in future crimes (save for the incapacitation effect) nor dissuade others so situated from committing similar crimes. On the other hand, we would be loathe to release a person suffering from an obvious disorder onto the streets again without doing something about that disorder.

If, as in Hinckley's case, the disorder was something for which no acceptable treatment existed, the period of confinement could potentially extend well beyond that of a judicially imposed criminal sanction. The Supreme Court has in fact held that the Due Process Clause of the Fourteenth Amendment permits involuntary commitment of an insanity acquittee for a period longer than the acquittee might have served in prison.[54] At this stage in medicine's ability to diagnose and treat mental illness, that may be the only alternative we have.

B. Treatment and Prevention

In addition to seeking novel treatment for mental illnesses, society seemingly could do a better job of determining who may be at risk for certain conditions. This in turn could lead to early childhood intervention to assure that those most at risk receive proper nutrition and socialization. Society currently provides special educational opportunities for those suffering from mental retardation, or even children who, while

54. *See* Jones v. United States, 463 U.S. 354, 369 (1983) ("There simply is no necessary correlation between severity of the offense and length of time necessary for recovery. The length of the acquittee's hypothetical criminal sentence therefore is irrelevant to the purposes of his commitment."). The confined individual would surely have to be released, however, if he were no longer dangerous. *See* Foucha v. Louisiana, 504 U.S. 71, 77, 84-86 (1992) (noting that post-insanity acquittal commitment is justified only if the person is both mentally ill and dangerous) (citing *Jones*, 463 U.S. at 368-70). But, dangerousness might prove to be extraordinarily difficult to assess.

otherwise healthy and normal, nevertheless suffer from hearing or vision loss. If we commit resources to provide for children with these disabilities, we arguably should similarly provide resources for children whose disabilities, while less obvious, are nevertheless equally capable of preventing that child from growing into healthy adulthood.

There is a darker side to this hopeful vision of early and helpful state intervention. Discovery of the potential link between serotonin levels and violent behavior suggests the possibility of being able to predict who will engage in criminal conduct. This is both the hope and the fear of criminal justice professionals. The hope has long been that, given an ability to intervene positively in a child's life, one might prevent a child from becoming a future offender. The ability to predict behavior accurately, however, brings with it the fear of discrimination and the possible medicalization of problems better addressed through environmental manipulation.

While it is unlikely that we would ever consider a particular mental abnormality itself grounds for establishing culpability of the criminal sort, it is not so far-fetched to envision a time when, once isolated, such anomalies could be used to foster coerced treatment or involuntary civil confinement. This is essentially what the Supreme Court addressed in *Kansas v. Hendricks*.[55] There, the Court decided that a State may civilly commit a sexually violent predator even after he has served a criminal sentence because of the likelihood that he will engage in further dangerous behavior.[56] In part, the Court's decision reflected the belief of legislators that psychiatrists could predict future dangerousness. The same reasoning that allows society to restrain someone who is thought to be a danger to himself or others for indefinite periods of time may be extended to offenders who are unable to control their actions because of a biological mutation. It is difficult to argue why the two situations should be distinguished, or furthermore why society should release an individual who still poses a significant danger to others.

Until *Hendricks*, we had never really seriously considered these issues because the possibility of predicting

55. 521 U.S. 346 (1997).
56. *See id.* at 369-71.

dangerousness with any degree of accuracy appeared so remote. But if we knew that a particular individual was likely to engage in criminal behavior at some point in the future, the effect of this knowledge and its practical goal of preventing crime might tilt us towards permitting coerced treatment or involuntary civil confinement. Society has, on occasion, quarantined those afflicted with highly communicable diseases. Might it not also be tempted to confine the potentially dangerous? Is that not what civil commitment proceedings effectively do?

Involuntary confinement, of course, is not the only coercive action we may confront. Certain psychotropic drugs have recently begun to be seen as quite effective in treating some mental disorders. The Supreme Court has ruled that where a prisoner's dangerousness or disability is attributable to a mental disorder, the involuntary administration of anti-psychotic drugs may be permissible without a judicial hearing, provided adequate procedural safeguards exist to protect the prisoner's interests.[57] The Court ruled that the state's interests in these circumstances outweighed the prisoner's liberty interest in avoiding treatment with anti-psychotic drugs.[58] This is not anything particularly innovative. Parents routinely medicate their children without the child's consent. Similarly, doctors treating patients in mental hospitals often are assigned carte blanche by the admitting family to treat the patient with whatever prevailing therapies may prove beneficial.

More precise knowledge of the brain's neurochemistry may make it possible one day to alter or enhance certain traits selectively. Thus, an individual like Inmate X who has a specific genetic abnormality may someday find himself "treated" and thus fundamentally altered in terms of personality traits and characteristics. This malleability of personality may come to suggest that what constitutes a "person" may simply be a manipulable set of possibilities rather than an individual with a unique, largely fixed set of characteristics whose very existence demands respect.

In addition to the question of what to do with those identified as potential criminals, there is the antecedent

57. *See* Washington v. Harper, 494 U.S. 210, 233-34 (1990).
58. *See id.* at 221-27.

question of, once the technical prowess exists, whether we should seek to identify them in the first place. Society presently demands compulsory vaccinations and requires children to be screened for vision and hearing problems. Those who would press for compulsory genetic or neurobiological screening would argue that the efforts were undertaken for the individual's best interests (if treatments were available) or for society's best interests (even if no treatment were available). The fact that no such arguments have been made may merely reflect the fact that the scientific foundation for accurately predicting future criminal acts does not exist. We are probably far from being able to predict successfully individual behavior on the basis of genetic testing performed at birth; the interaction between genes, environment, and other neurobiological factors is simply too poorly understood. At some point in the future, however, science may be able to possess a general predictive power. At that time, we will have to confront a whole host of troubling issues.

IV. WORDS OF CAUTION

With the completion of the human genome project, the profound advancements in neuroscience, and the development of sophisticated new tools to map neuroanatomy, science may be placing mankind on the brink of unraveling important mysteries of human behavior. As with all progress, however, a number of caveats are in order. It is important to view with a suspicious eye any claimants who assert that all or even some behaviors are controlled solely by our genes. Most modern research suggests that human behavior is a product of poorly understood interactions among certain genetic predispositions, environmental influences, and, yes, even conscious, informed decisions. It is therefore doubtful that a single gene is responsible for aggressive or impulsive behavior any more than a particular environment. In light of the complex interactions between the individual and his environment in determining what genetic traits may or may not be expressed, it is unlikely that science will ever be able to predict with any certainty the behavior of adults based upon tests performed during childhood.

On the other hand, such genetic testing may reveal propensities that may then be adjusted by manipulating

environmental factors. Similarly, *adult* behavior may ultimately prove to be predictable to a certain degree.[59] Once these predictive abilities of genetic testing or neurobiological screening become more accurate, society may be forced to reconsider the standards for preventive detention, treatment regimes, and the utility of early intervention. Privacy interests will need to be scrupulously guarded in these circumstances.

Additionally, understanding that biology plays a role in human behavior is not necessarily tantamount to saying that biology equals destiny. Merely because an individual has a genetic defect that affects serotonin uptake or is raised in a certain set of environmental circumstances does not necessarily dictate the type of life that individual may lead. The news media regularly regale us with stories of individuals who have overcome certain obvious handicaps in life to achieve spectacular, unexpected success. Similarly, it should come as no surprise that the complexity of the human animal makes it difficult, if not impossible, to predict behavior on the basis of one's genetic make-up. Most theories seeking to ascribe human behavior to biological causes focus on the distribution of certain characteristics within given populations. As a consequence, conclusions are drawn in only the broadest of terms and are not necessarily meant to apply to any individual.

To the extent a "cause" of a particular behavior is identified, as opposed to a mere correlation, that does not necessarily suggest a normative basis from which to proceed in constructing policy or altering legal rules. If, for instance, we can determine that university professors, as they age, become unable adequately to assess risk because, as a group, their prefrontal lobe deterioration is particularly acute, it does not necessarily follow that society should choose automatically to limit professors' abilities to engage in contractual relationships. As Professor Moore has argued, "[c]ausation is not compulsion. If we want to show that some causally relevant factor constitutes a compulsion, we can do so only by showing that

59. Researchers have reported using measures of serotonin and glucose uptake to predict relatively accurately recidivism among those guilty of homicide and arson. *See* Matti Virkkunen et al., *Cerebrospinal Fluid Monoamine Metabolite Levels in Male Arsonists*, *in* THE NEUROTRANSMITTER REVOLUTION: SEROTONIN, SOCIAL BEHAVIOR AND THE LAW, *supra* note 13, at 69.

that factor interferes with practical reasoning."[60]

We also should not leap to revise our understanding of the utility of the moral or legal concepts that have proven remarkably useful to human beings over the course of history. The recognition, for example, that low serotonin levels resulting from an organic brain disorder may "cause" certain types of anti-social behavior need not destroy our moral framework. If neurotransmitter chemistry or other aspects of brain bio-chemistry turn out to be correlated with what the law already deems a serious impairment of reason, this does not directly affect the case for exculpation or mitigation; rather, the existence of an impairment in one's ability to control one's behavior is itself what matters, not the underlying reason for that impairment. Conversely, even if it can be medically demonstrated that a criminal defendant possesses a biological abnormality of some type, that is not necessarily itself grounds for excuse. Instead, it must still be demonstrated that the abnormality is itself connected to the inability to choose or the failure to appreciate the wrongfulness of one's conduct. If no connection between the abnormality and a failure of reason can be shown, the existence of the abnormality cannot serve to mitigate culpability. In similar fashion, the failure to find a precise physical defect may not necessarily preclude a claim of impairment.

Essentially, our understanding of the terms of *mens rea* or legal causation may simply change to accommodate better understandings of human behavior. This is not dissimilar to what has occurred with respect to the legal definition of death, or what may yet occur with respect to our regulation of abortion.

The standard definition of death once required a cessation of the individual's respiratory and circulatory functions. After

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60. Michael S. Moore, *Causation and the Excuses*, 73 CAL. L. REV. 1091, 1131 (1985). He explains that:

> Nothing in [the] status conception of insanity implicitly refers us back to causation. It is not because their mental disease causes the insane to commit crimes that we excuse them, no more than it is because an infant's lack of rationality causes him to do bad that we excuse him. Rather, in both cases we excuse because the actors lack the status of moral agents. . . . Our practices of assessing merit and responsibility are consistent with the proposition that persons are responsible for their (determined) choices, inconsistent with its negation.

Id. at 1137, 1144.

medical technology enabled the mechanical continuation of those processes, states began to shift to a "brain dead" view of legal death. Thus, even if the person's heart and lung activity could be maintained, if all brain activity had ceased, the individual could be declared legally dead. The underlying legal concept did not really change; rather, the definition merely shifted to accommodate advancing technologies.

With respect to abortion, the touchstone in *Roe v. Wade*[61] was the viability of the fetus. Prior to an unborn child's ability to live outside the womb, the Supreme Court reasoned that the mother's privacy interests trumped those of the State or of the fetus. Once the fetus became viable, however, the State's interest in preserving the baby became more substantial. The question now is whether, as medical technology pushes back the date at which the fetus becomes viable, the state's interest may become more pronounced at an ever-earlier time.

As times and technologies change, common-law concepts have proven remarkably resilient and adaptable. The same will doubtless be true of concepts like *mens rea* and personal responsibility.

V. A FINAL THOUGHT

The French have a celebrated saying that "to understand all is to forgive all." Whether that adage reflects social reality is somewhat beside the point. Much of what I have discussed in this essay is hypothetical and all of it is controversial. Despite claims to the contrary in the popular press, science is far from understanding the complexity of human psychology or its biological, causative roots. What policy-makers often fail to appreciate is the nature of the scientific process. Although scientific progress is commonly viewed as a steady, sure progression, such a view is far from reality. Scientific inquiry often proceeds in fits and starts, with many dead ends and stumbles. Contrast this with the nature of common-law development. While hardly orderly, the development of common-law norms tends to remain far more stable over time. Society seeks stability in its legal mechanisms—the sort of stability that does not pervade scientific inquiry.

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61. 410 U.S. 113 (1973).

In part, the greatest resistance to the study of the biological origins of criminal behavior comes from an abiding fear of the answers we may uncover. These answers might threaten our notions of individual liberty and our sacred belief that "all men are created equal." Biological differences among people might belie the notion of true equality. Yet the greater danger lies in refusing to address squarely the questions of the biological and environmental roots of criminal behavior as newspaper headlines make poorly supported claims that genes have been isolated that control human behaviors and personality traits. Policy-makers must begin to educate themselves with respect to the medical and moral dimensions of these issues and devote to them the serious attention they warrant.

Moreover, the benefits of such research may be enormous. If, for example, we were able to diagnose, by the prick of a needle on a baby's foot, that the individual may have a propensity for violence, should not the state intervene to ensure that circumstances might be manipulated to create the best possible environment for the child? Similarly, if a criminal can be determined to have genetic markers suggesting proclivities for violence, should the government be able to treat that individual differently from someone who does not bear those markers, but commits the same offense? These questions may someday demand answers that will require serious thought.

As Francis Bacon sagaciously observed: "Nature is often hidden; sometimes overcome; seldom extinguished."[62] There is no silver bullet capable of neutralizing the biological or social triggers that set an individual on the path to violence. We are years from understanding much basic neurobiology or engaging in genetic manipulation to alter the human condition. Still, deeper knowledge of the biology of violence will enable society to match violence-prone individuals with intervention programs and may cause us, at least in part, to revisit our attitudes towards criminal behavior and rethink such basic notions as *mens rea* and the imposition of punishment on the mentally ill. The future, as always, holds both great promise and great peril. Either way, we must be prepared to meet it.

62. Francis Bacon, *Of Nature in Men*, *in* THE ESSAYES OR COUNSELS, CIVILL AND MORALL, OF FRANCIS BACON (Judy Boss trans., Renascence Editions 1998) (1625), *at* http://darkwing.uoregon.edu/~rbear/bacon.html#38.