

# Genetics, Brain Damage and Crime

BY NATHANIEL WEYL

It has been known for some time that virtually all types of low-grade mental deficiency are caused either by massive brain damage or by such single-gene or single-chromosome mutations as manifest themselves in Down's syndrome, amaurotic idiocy or phenylketonuria.<sup>1</sup> In the wake of the tragic assassination of Senator Robert F. Kennedy, the view is being advanced with increasing insistence that crimes of violence may also be closely associated with genetic defects or with trauma or pathology of the brain.

One of the more interesting instances of this relationship is the apparent predisposition of individuals with an XYY sex-chromosome complement toward crimes of violence. Normal men have XY and normal women XX sex-chromosome complements. Trisomies and tetrasomies are genetic errors which normally involve mental deficiency. A familiar example is the causal relationship between chromosome-21 trisomy and Down's syndrome (mongolism). Where the trisomy occurs in the sex-chromosome complement, aberrant sexuality, as well as mental defect, generally occurs. An instance is Klinefelter's syndrome, caused by the presence of an extra X chromosome to yield an XXY trisomy. This additional element of "femininity" results in individuals who are male in phenotype, but generally have small, undeveloped testes, suffer from testicular lesions, are incapable of producing spermatazoa and manifest gynaecomastia—the pathological enlargement of breasts in the male.<sup>2</sup>

As late as 1961, the existence of XYY trisomies was ignored in competent surveys of progress in genetics.<sup>3</sup> Just as the XXY combination causes male feminization, so does the presence of an extra XY chromosome manifest itself in more than average masculinity and probably in abnormally high tendencies toward violence. In the rare case of XXYY tetrasomies, mentally defective bearers of this chromosome complement in British and Swedish institutions

<sup>1</sup> *Handbook of Mental Deficiency* (editor N. R. Ellis), McGraw-Hill, New York, 1963, p. 276.

<sup>2</sup> D. G. Harndon, "The Chromosomes," *Recent Advances in Human Genetics*, (editors L. S. Penrose and Helen Lang Brown), J. and A. Churchill, London, 1961, p. 28.

<sup>3</sup> Harndon, *op. cit.*

were found to be over-represented among the unmanageable and criminal groups of inmates.

Until very recently, it was believed that the XYY trisomies constituted about .07 per cent of the general population and about 50 times that fraction of the population of institutions for the feeble-minded and mentally diseased. However, a study of 3700 consecutive births, reported by Dr Park S. Gerald of Harvard Medical School and two associates at a John Hopkins conference at the Jackson Laboratory in August 1968, revealed that XYYs occur with a frequency of approximately one in every 300 of the male population.<sup>4</sup> Parallel investigations in Australia and Pennsylvania suggest that the XYYs average six inches taller than normal males, that they suffer from severe acne (probably caused by abnormally high production of male hormones), that they are addicted to crimes of violence and that they are more likely to get into trouble with the law at an early age than run-of-the-mill XY offenders. Four XYYs were found in Australia who were in prison for larceny, attempted murder and murder.<sup>5</sup> However, a Scottish study revealed that proportionately more XYYs commit crimes against property than crimes of violence or sex. While usually mentally deficient and either psychopathic or sociopathic, the XYYs do not suffer from organic brain damage.

As would be expected on general theoretical grounds, the siblings of people with XYY-chromosome complements show an average to below-average tendency toward criminality. In other words, the trisomy is a single chromosomal accident, occurring usually in an otherwise normal person, and there is no reason to expect this accident to be repeated more frequently among the victim's siblings than in the general population. By contrast, in the general etiology of crime, "a violent individual tends to come from a violent family," as Dr Frank R. Ervin of the Massachusetts General Hospital team studying crimes of violence put the matter.

There is an analogous situation in the field of amentia. In 1952 Roberts plotted the frequency distribution of the IQs of 562 siblings of low-grade and high-grade mental defectives. He found that the first group (siblings of imbeciles) had IQs about 20 points higher on the average than the second group (siblings of the feeble-minded). The probable reason for this was that the imbeciles owed their condition to single-gene or single-chromosome mutations of a highly deleterious sort, whereas the less defective element, the feeble-minded, were presumably deficient because of polygenic factors. The siblings of the imbeciles ran no more risk of inheriting the single mutation that caused imbecility than the general population; the siblings of the feeble-minded, on the other hand, manifested the

<sup>4</sup>"Genetic Defect Triggers Violent Crime? New Study Shows Rise in Probability," *Miami Herald*, 8th August 1968, p. 11-A.

<sup>5</sup>"Genetics: Of Chromosomes and Crime," *Time*, 3rd May 1968, p. 41.

same polygenically caused inferiority that had caused their brothers or sisters to be put into mental institutions.<sup>6</sup>

One of the most notorious of American XYY-trisomy criminals is Richard Speck, who sexually attacked and murdered eight Chicago nurses. Sentenced to death and awaiting execution, Speck's life was saved by a recent Supreme Court ruling. An almost equally notorious mass murderer, Charles J. Whitman, climbed to the top of a Texas university tower in August 1966 and killed 14 people, unknown to him and against whom he had no known grievance, by rifle fire. An autopsy of Whitman, who was killed during his homicidal orgy, disclosed a tumor in the right temporal lobe of his brain which, in the opinion of a medical examining committee, "could have contributed to his inability to control his emotions and actions." Of some interest was the suggestion by the defense in the trial of Sirhan B. Sirhan, Senator Kennedy's assassin, that the killer suffered a personality change when thrown from a horse in 1966, that brain damage ensued and that, in consequence, Sirhan was not guilty by reason of insanity.<sup>7</sup>

At this stage of research, one can merely hazard rough guesses at the proportion of crimes of violence imputable to brain damage or single-chromosome defect. The estimate that XYY trisomies occur in one male out of 300 does not seem out of line with the reported frequencies of other chromosomal abnormalities. Thus, Penrose summarized studies showing that mongolism (a 21-trisomy) occurred in 345 out of 224,667 births studied—a frequency of one to 650.<sup>8</sup> As for brain damage, Dr Robert F. Heimburger, Professor of Neurosurgery at the Indiana University Medical Center, has reported that 40 per cent of the 70 people referred to him because of their violent behavior suffered from organic brain damage. Dr John M. McDonald, Director of Forensic Medicine at the University of Colorado, found that 19 per cent of a group of 100 patients who had threatened to commit homicide and had voluntarily been admitted to a Colorado mental hospital were suffering from organic disease of the brain.<sup>9</sup>

This radical shift in emphasis from an environmentalist to a genetic and medical approach to the etiology of crime offers encouraging perspectives for mass diagnosis and preventive action. The warning symptoms are generally a history of abnormally aggressive

<sup>6</sup> J. A. Fraser Roberts, "The Genetics of Mental Deficiency," *Eugenics Review*, 1952, Vol. 44, p. 71-83; Steven G. Vandenberg, "The Nature and Nurture of Intelligence," *Biology and Behavior Genetics: Proceedings of a Conference under the Auspices of Russell Sage Foundation, the Social Science Research Council and the Rockefeller University* (editor David C. Glass), Rockefeller University Press and Russell Sage Foundation, New York, 1968, p. 24.

<sup>7</sup> See also Ronald Kessler, "Trial of Kennedy's Accused Killer to Air Theory that Violence is Medical Problem," *Wall Street Journal*, 24th June 1968, p. 2.

<sup>8</sup> Harndon, *op. cit.*, p. 11.

<sup>9</sup> Kessler, *op. cit.*

and violent behavior. Where this is caused by brain damage, the problem may be that the destroyed and diseased tissue has forced realignment of the brain's electrical system so that an almost constant electrical discharge occurs, causing massive impulses towards aggression and violence. Usually, extensive motor-control, EEG and X-ray tests are needed to pinpoint the damage. In the case of individuals whose criminal impetuses derive from XYY trisomies, organic brain damage will be absent and the chromosomal anomaly must be detected by taking karyotypes from the patient's leukocytes.

Given accurate diagnosis of brain damage, treatment of the patient to remove or deflect into harmless channels his aggressive impulses may take the form of brain surgery or administration of drugs. Affected brain tissue is often destroyed by cryosurgical methods, that is to say, by the use of probes at such fantastically low temperatures that they kill cells on contact. The use of radioactive beads for localized cell destruction is also being expanded. An increasing pharmacopia serves to stimulate or anaesthetize, according to need, affected portions of brain. In the case of XYY trisomies, however, the theoretical solution would be to restructure the sex-chromosome complement either directly or perhaps through changing DNA or RNA. All this lies far in the future.

Linus Pauling, 1954 Nobel Laureate in Chemistry, has theorized that significant individual differences in brain-nutrient needs for vitamins, amino acids and fatty acids may cause mental aberration and disfunction. He suggests that the variation from the normal in these brain-nutrient requirements may be very large in cases of cerebral damage or genetic or chromosomal anomaly. Pauling predicts that this field, which he has christened orthomolecular psychiatry, may be one of the most fruitful areas of medical and biochemical research of the near future.

#### POSSIBLE SOCIAL AND POLITICAL IMPLICATIONS

The advance of medical genetics into criminology clashes with the dominant sociological school. This is not the old sterile dichotomy of heredity versus environment. Tumors and genetic abnormalities do not directly cause crime: what they probably do is to create a much greater than average urge toward violence and/or a weakening of the psychic controls against such outbursts. The impulse toward violence must be triggered by some environmental factor. One can say that genes define the potential and environment realises it, or, if one prefers, that reciprocal causal interaction exists between the two sets of factors.

The dominant sociological school of criminology does not, however, content itself with the assertion that genotypes do not cause anti-social behavior *in vacuo*. It asserts that criminals are not born, but are made by an imperfect society; that it is not the malefactor who is guilty for his acts, but the injustice of the social order

which warps his character. A generation of psychologists, psychiatrists, sociologists, social anthropologists, political scientists and social workers has denounced Lombroso for his pioneer efforts to trace connections between criminality and somatype (an approach which now seems to have been in the right general direction) and has insisted that crime can be eliminated by showering more and more *largesse* on the poor, the unsuccessful, the uneducated and the improvident.

An egregious example of this sociological approach to crime is the conclusion by the National Advisory Commission on Civil Disorders that the high crime rate in the Negro slums of American cities can be imputed to black alienation from a society marked by "criminally inferior education, pervasive economic and job discrimination . . . houses unfit for human habitation . . .," and so on.<sup>10</sup> This imputed cause is bare assertion, not backed by any presentation of evidence. One would have thought that the authors of this influential report would have realized that, if these putative causes were real ones, Negro crime would have declined as a result of two decades of accelerated improvement in both the education and the housing of the American colored population. On the contrary, the crime rate in the United States, both among Blacks and among Whites, has increased steadily and alarmingly during the decades in question and the increases have been most marked in those northern urban areas where the supposed social welfare remedies have been most strenuously applied.

Other sociological "investigations" of the causes of crime turn out to be little more than academic cloaks, giving spurious status to the researcher's prejudices against and hostility toward the society in which he lives. A certain Dr Urie Bronfenbrenner of Cornell, for instance, recently informed Americans that "violence is a natural reaction to a world in which people are not being treated as people" and that the United States lacks "explicit training in what it means to treat others with dignity and compassion . . ."<sup>11</sup>

The underlying theme of afflatus of this sort would seem to be that the criminal is justified because he is in righteous rebellion against an evil society. It is perhaps primarily significant as an indication of the extent to which the social science faculties of American colleges and universities differentially attract people of limited ability who find it difficult to adjust to a free society and who radiate attitudes of envy and rancor among the students they influence.\*

<sup>10</sup> The National Advisory Commission on Civil Disorders, *Report*, United States Government Printing Office, Washington D.C., 1st March 1968, pp. 157-158.

<sup>11</sup> "Violence: Social Science on the Horns of an Old Dilemma," *Science News*, 22nd June 1968, p. 590.

\* The author need not restrict this comment to American institutions. It is largely equally applicable to the whole English-speaking world.—EDITOR.

The old theory that the main cause of crime is poverty received its *prima facie* refutation when crime rates throughout the Western world soared during periods when the national income was rising rapidly and when the income levels among different classes and races were increasingly becoming more equal. In America, despite the fact that Negroes have shared more than proportionately in every phase of national economic and educational advance, they continue to account for proportionately ten times as many major crimes as Whites. That this massive Negro tendency toward criminal conduct is not an expression of hostility toward "White oppression" is indicated by the fact that most victims of Negro criminals are Negroes and that the Black crime rate is lower in southern cities, where integration is restricted, than in northern urban areas, where it is widespread.

The conservative view that the upsurge in crime is related to such phenomena as erosion of parental control, of the family, of basic law enforcement and of general moral standards, seems more in conformity with available evidence. In the specific case of the Negro, rising criminality may result mainly from frustration at the gap between the unrealistic promises of White politicians and social welfare people and the facts of economic life. The Negro has been told that he is at the bottom of society's pyramid because of White oppression, that there are no inherent limitations holding him back and that, once certain legal and social disabilities are removed, he can expect the same sort of phenomenal advance that characterized White immigration into the United States in previous generations. The disabilities are removed, but the fundamental position of the Negro in American society changes little. The effortless vault to affluence does not materialize. Negro leaders are quick to blame visible stagnation on White oppression. Their more restless, disoriented and frustrated followers (who are by no means necessarily the least educated ones) often react with spasms of destruction and violence.

The theory that crime is caused by social injustice has been used for over a generation to push back the frontiers of personal responsibility. In the area of criminal law, the doctrine of irresponsibility has had two separate erosive influences. The extension of the doctrine of non-guilt by reason of insanity from the old and comparatively sensible McNaghten Rule through "temporary insanity" to new and sophisticated approaches in which any sort of mental disability is sometimes deemed sufficient reason to refuse to proclaim guilt or impose punishment is the more direct and manifest form of this erosion. The second, and indirect, approach is exemplified by an intricate and sophistic labyrinthine maze of rulings by which the United States Supreme Court and lesser appellate tribunals have given the criminal such procedural protection as to render successful prosecution immensely difficult. The motive behind these

rulings is not fondness for crime or the criminal class on the part of the courts, but rather a belief that poor and uneducated malefactors are victims of society and hence should be protected, when accused, against the superior resources, intelligence and cunning of the prosecution.

One of the interesting problems which the medico-genetic approach to crime raises is the attitude of the liberal Establishment toward this new view of things. The latter is self-evidently in contradiction to the environmentalist, behaviorist and egalitarian psychological theories beloved by Western liberal sociologists, to the old Lockian *tabula rasa* theory of the mind, to the more modern Skinnerian stimulus-response psychology (which has been characterized by Koestler and von Bertalanffy as a "zoomorphic" view of man), and to the melioristic faith that men are born susceptible to being either debauched by bad institutions or made perfect by beneficent ones.<sup>12</sup> To conclude that the medico-genetic approach to crime will be rejected out of hand by the Establishment would assume a naïve adherence to the faded and shot-riddled doctrines of human perfectibility through education that seems improbable in a generation reared on Freud and Marx and witness to Stalinist forced labor and Nazi extermination camps. Thus, a grudging and qualified acceptance of the new approach seems probable. The discovery of traumatic, pathological and genetic causes for criminal behavior may be used to undercut the conservative stress on individual responsibility. It will be asked whether the criminal chose his tumor or trisomy and, if he did not freely choose them, how can he be guilty? On the other hand, any medico-genetic theory of criminality necessarily undercuts the liberal doctrine that unlimited social welfare spending is the means of abolishing the causes of crime.

In a rather stimulating paper, Marvin Bressler of the Princeton Sociology Department suggested that the fundamental difference between the liberal and conservative ideologies was one of class outlook. Liberals, he observed, "identify with the losers, are *the theoreticians of lower class failure . . .*," (my emphasis) whereas conservatives "celebrate the triumphs of the victors and prefer to speak of 'ambition,' 'dedication' and 'superior intelligence' in the manner of the older social biology."<sup>13</sup>

#### GENETICS AND RESPONSIBILITY

Discussion of trisomies and tumors raises rather basic questions of redefining the nature of legal responsibility and the areas in which punishment may justly be imposed for crime. The historic origin of

<sup>12</sup> Arthur Koestler, *The Ghost in the Machine*, Hutchinson, London, 1968; Ludwig von Bertalanffy, *Robots, Men and Minds*, Braziller, New York, 1967.

<sup>13</sup> Marvin Bressler, "Sociology and Ideology," in Glass, *op. cit.*, p. 200.

the concept of responsibility is the evolution of a distinction between the actions a man wills and those he does not—a distinction that seemed irrelevant to primitive and animistic societies in which all misfortune was attributed to the malevolence of spirits, deities or human agents. The McNaghten Rule, proclaimed about a century ago, states that “it must be clearly proved that, at the time of the committing of the act, the party accused was laboring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing; or, if he did know it, that he did not know he was doing what was wrong.” This definition of innocence by reason of insanity is clear as long as the words are used without regard to their philosophical implications. Fortunately, the courts have held that knowledge of “the nature and quality” of an act and consciousness of wrong-doing do not imply a philosophical understanding by the criminal of the nature of immorality or crime, but mean merely that the offender knew what he was doing and knew that society regarded it as an offense.

By the McNaghten Rule, the trisomy murderers and frenzied men stirred to violence by disjointed electrical discharges through tumor-damaged areas of their brain would probably for the most part be judged guilty. According to the irresistible impulse theory, they probably would not. Under the modern, latitudinarian American doctrines of criminal responsibility, they would almost certainly go free.

Where is the line to be drawn? Pinpointing of a trisomy shows at best that the crime had a known cause. What about the case of moral monsters, such as the late Heinrich Himmler or the Nigerian army officers who, when they capture Ibo villages, herd the children into huts and then nail the doors and windows shut so they will starve to death? People of this sort are presumably of inferior or socially undesirable genetic inheritance. Whether the predisposition toward crime or moral enormity proceeds from a monogenic or polygenic etiology would seem morally irrelevant. If it can be argued that no one chooses his genes and therefore that no one is ever guilty, then the whole rationale of punishment dissolves.

A restructuring of the insanity doctrine might seek to bypass the entire issue of free will and begin and end its examination of responsibility with the determination of intent. A man who knowingly commits a crime is felonious; a man who unknowingly does so is at worst negligent.

Given determination of intent, the problem of punishment would become primarily one of general deterrence. Society would cease to be preoccupied with the question of whether a man is responsible for a brain tumor that causes him to fly into ungovernable rages, for an addiction to alcohol that makes him feral, or for a polygenic heritage of undesirable mutations that makes him a destructive person. Instead, the pertinent question would be whether the



imposition of condign punishment will dissuade others and whether the dissuasive effect will be sufficient to justify inflicting the penalty. Deterrence need not be restricted to crimes and criminals of exactly the same class. For example, it could be argued that a trisomy murderer's brain is swept by such irresistible surges of violence that not even the certainty of execution would dissuade him from murder. The question would still remain open whether the execution of such offenders would deter sane, would-be murderers from homicide. It would seem safe to assume that men have committed crimes on the theory that they could escape the consequences by pretending insanity.

The ultimately hopeful element in the medico-genetic approach to crime is the long-range perspective of genetic and chemical therapy capable of identifying and curing chronic thieves, murderers and perhaps even those idealistic political figures who commit the really vast genocidal enormities of history. Hopefully, this may some day be done before these people embark on their careers. The vista of genetic reshuffling and tampering with the brain has its horrifying implications, but not, I would think, where these devices are used solely to excise brainstorms of uncontrolled violence and destruction.

Finally the medico-genetic approach has implications for the student of ethnology. What is the comparative distribution of trisomies and other lethal and deleterious mutations affecting intelligence among the races and subraces of mankind? Are there differences in the frequencies of these abnormalities and do they relate to observed psychic differences? Is there any genetic significance, for instance, to the frequently observed prevalence of "physical feminization" among African Negro men, as manifested by the high incidences of male carcinoma of the breast, fragile bone development, knock knees, gynaecomastia and testicular atrophy?<sup>14</sup> Do similar differences prevail in the frequency of brain tumors and head injuries among different races? Calvin Wells has suggested that "aggression fractures" in general are rather uncommon among ancient Anglo-Saxons, Hawaiians, Iranians, French and Peruvians, whereas they seem to have been prevalent among Pueblo Indians of the American south-west, Nubians and Egyptians.<sup>15</sup> If significant frequency differences exist, what are their probable causes and to what extent do they contribute to the explanation of observed psychic differences between the racial groups in question? The inquiry need not be confined to those trisomies, monogenic mutations, brain injuries

<sup>14</sup> H. C. Trowel, *East African Medical Journal*, 1948, Vol. 25, pp. 236; F. W. Vint, *East African Medical Journal*, 1949, Vol. 26, p. 58; J. C. Carothers, *The African Mind in Health and Disease: A study in Ethnopsychiatry*, World Health Organisation, Geneva, 1953, p. 63.

<sup>15</sup> Calvin Wells, *Bones, Bodies and Disease*, Praeger, New York, 1964, pp. 52-56.

and traumas which are believed to cause tendencies toward criminal conduct. The more general rule is that they cause mental deficiency. It is entirely possible that the observed differences in the intelligence of different races will prove to be associated, at least in part, with different frequencies of single-gene and single-chromosome mutations and of brain injuries and organic brain damage.

# Mlimo—Lemba or Venda

BY N. A. HUNT

Following the work carried out by the Editor on the Lemba and Venda tribes of Rhodesia more evidence has come to light which supports his theory that these two tribes were among those who were responsible for the Zimbabwe civilization.

The evidence concerns Mlimo, the powerful rain god who is said to live in a cave in the Matopos near Bulawayo. His utterances are heeded with deep respect by Africans throughout Rhodesia and it has always been thought that the oracle or medium through which he (the spirit) spoke was a Mukaranga. It now appears—on very good authority—that the medium is not a Karanga at all but a Venda, which seems to support the Editor's theory that the Lembas and Vendas are the remnants of a once dominant aristocracy.

The office of Mlimo is not held temporarily by a Venda but has always been occupied by someone from that tribe. It seems possible, therefore, that when the Karanga came to Rhodesia they found the Mlimo already in control and that when the Venda or Lemba regime was overthrown the spiritual authority continued to function in the form of the Mlimo.

The fact that the Mlimo is a Venda would seem to explain why Moselikatse and Lobengula did not exterminate him as they did any Karanga they came across—he was not one of the despised Karanga. In fact, far from attacking him the Amandebele "amakosi" sent him gifts—through intermediaries, of course, to save face. To this day the important Amandebele chiefs do not consult the Mlimo directly but contact him through a third party. It has never been understood why the Amandebele chiefs should propitiate, even at second hand, one of the despised Amahole, but if the medium is a Venda the reason becomes more easily understandable.