

An Enigmatic Personality: Case Report of a Serial Killer

Richard T. Kraus, M.D., F.A.P.A.¹

Abstract

This case report describes a man with aggressive and anti-social behaviors, a 47, XYY karyotype, abnormally elevated urinary kryptopyrroles and multiple brain injuries who is now serving a 250 year sentence for the serial murders of 11 women. These multiple abnormal findings have relevance as identifiable precursors for potential violence in such individuals with a history of behavioral disturbance and are discussed on a background of his case history and review of the literature.

Introduction

An understanding of the extraordinary violence that finds its ultimate expression in serial homicides has become the focus of considerable research and nationwide concern. According to one report, at least 5,000 Americans yearly are victims of serial killers (Holmes and DeBurger, 1985), reflecting a re-emergence of a phenomenon that can be traced to medieval times. Over the past two decades, 151 serial killers have collectively committed over 900 murders (Youngstrom, N. Monitor, 1991). If, as reported, there are anywhere from 30 to 100 (or more) unknown serial killers in the country today (Holmes et al, 1985), the number of potential victims at risk is considerable. While single homicides usually have identifiable motives such as heat of passion, revenge, despair, frustration, or personal gain, serial homicides are repetitive acts of violent deviant sexuality whose aim appears senseless and irrational. This impression is reinforced by the fact that the victims, who are usually complete strangers to the serial killer, often bear an eerie resemblance to each other (Liebman, 1989). Profiles of selected serial killers have described them as young, mostly white, loners

with violent sexual fantasies who have recognized psychiatric disorders which include the paraphilias, sexual sadism, anti-social, narcissistic and borderline personality organization (Youngstrom, N., *ibid*). A heuristic classification distinguishes organized offenders who are predatory, seeking "victims of opportunity" from disorganized offenders who kill suddenly on impulse without apparent planning or premeditation (Ressler et al, 1988). Some live outwardly normal lives as members of their community and kill their victims in the general vicinity of their residence (geographically stable) while others have the characteristics of drifters (geographically transient) whose victims are found in different locations throughout the country (Holmes et al, *ibid*).

A reported finding in the early experience of some serial killers is a pattern of parental cruelty, abuse, neglect, rejection, and violence in families with histories of alcoholism, criminal behaviors and psychiatric disorders. However, these diagnostic and social findings do not explain why certain individuals have an apparent compulsion to commit serial murders (Ressler et al, *ibid*).

In this case, there was no predisposing family history of alcoholism, violence, criminality, or psychiatric disorder and no evidence of parental abuse, neglect, abandonment, or cruelty. However, at age seven years, this "...bright, well-dressed, neat..." child (as he was then described) was beginning to exhibit solitary aggressive conduct disordered behaviors which set him apart from his family, alienated him from his peers, and probably contributed to his becoming a loner. In the years that followed, his life style became that of repeated aggressive and anti-social behaviors, with convictions for burglary, arson, manslaughter, and finally, the serial homicides of 11 women.

In a review of selected studies on the relationship of biological factors and antisocial behaviors, Mednick (1983) said that the causal variables of criminal behavior

1. Diplomate American Board Psychiatry and Neurology. 387 Monroe Street. Honcoye Falls. New York 14472-9745.

should include consideration of biological predispositions, in the

same sense as familial, social, and environmental factors. According to Elliott (1990), "...recurrent interpersonal violence with intent to harm is not solely a product of psychiatric disorder or social adversity or physiologic deviance but the result of a confluence and interaction at any given moment of multiple biologic and environmental variables..." Other authors, such as Pitcher (1982) believe that biologic factors have relevance to violence and crime and should not be overlooked or dismissed on ideological grounds.

Some years ago, in his book "The Mind of the Murderer" (1960), Manfred S. Gutt-macher, M.D., said: "It is an enigma that in our highly civilized country, murder should be an important cause of death ... Criminals ... particularly those who have committed the gravest of all crimes, the taking of human life, present a stimulating challenge. One keeps continually asking why - why -why - and sometimes one gets a satisfying answer."

Case History

Discovery

During a period of 18 months, the bodies of one black and ten white women, of whom ten were known prostitutes, were discovered in various isolated places over a 30-mile wide area. All the victims had apparently died by strangulation, suffocation, or trauma. Two of the victims had been mutilated and, in one instance, only skeletal remains with head missing were found. At the time of his arrest, media accounts described this (then) 45-year old white male as a person who "seemed to live above suspicion." Neighbors who knew him reacted with disbelief and a prostitute who recalled dating him twice said: "He wasn't weird, he wasn't rude." (Democrat & Chronicle, Jan 5 &6, 1990).

Previously married and divorced three times and the father of one son, he lived with his fourth wife in an apartment and held a night time job as a salad maker for a local food distributor. However, he had already spent more than a third of his life in prison for prior convictions of burglary, arson, and

the 1972 manslaughter deaths of two children, a 10-year old boy and the rape/murder of an 8-year old girl.

While still in prison for these manslaughter convictions, various parole reports described him as "...an extremely unusual person...one whose actual inner workings are probably completely beyond comprehension...replete with pathologies...a real danger to the welfare and safety of society. ..(for whom) the psychiatric and psychological profession has apparently not as yet defined a diagnosis for this inmate's aberrant behavior or even more pertinently, a cure..." After his parole release, a memo written by a senior parole officer said: "At the risk of being dramatic, the writer considers this man to be possibly the most dangerous individual to have been released to this community in many years." Ten months later, the first victim disappeared.

Early Life History - Part I

He was the oldest of four children, having two younger sisters and one younger brother, reared in a rural extended family setting in a home built by his father on land owned by his grandfather. Nearby lived grandparents, cousins, aunts, and uncles. At the time of birth, his mother was just 18 years old while his father was a 21-year old, Pfc in the Marine Corps, reassigned to guard duty in this country after being wounded in World War II during the initial invasion of Guadalcanal. In recalling that time of her life, his mother said: "We were a family. We loved him. We never abused him. He was a beautiful baby" whom she thought she may have spoiled. There was no history of known developmental delays and prior to starting school was remembered as a "good child." However, at age six years, he began to behave differently from his siblings and parents. He would wander away from school and home, was described as unreliable, a child who preferred to be by himself, and at age seven years was referred to a mental health clinic after hitting other school children with an iron bar on a school bus.

The mental health records at that time described him as an "attractive, well-dressed, neat child" with "visual difficulty...(who tries) very hard to say the right things to avoid getting into trouble." His mother

complained that he was "...not behaving good like his sisters and brother..." He spent money given to him for school lunch and seemed to be constantly seeking attention, "...one can't tell what he will do (from moment to moment or day to day)...(he) seems to want to be first...has no play- mates...(it is) hard to get the truth from him because he seems afraid (and) obeys only when punished by some means other than spanking..." His mother was said to be "...thin, nervous, pleasant, interested in her home and family and anxious to do what is best for her son. She just "...wished she knew what made him act the way he does..." His father, by then employed as a machine operator, was described as a quiet man who plays with his children and is "...far too easy going..." with his problem son.

Psychological evaluation utilizing the Blacky Test reported the following: "He does not like school...does not like his sisters and brother because they won't play with him...harbors a fair amount of diffuse hostility, especially towards his mother... seems unable to find legitimate outlets for it...defenseless objects seem to take the brunt...his conscience does not seem to be strongly developed as yet...his inability to direct hostility towards the mother seems to be due more to fear of punishment (including rejection) than to introjection of moral standards. He feels as if he is a bad boy a lot of the time and is hostile enough in a confused sort of way to want to remain bad...especially towards his mother...his confused hostilities make parental identification difficult...he feels he should identify with both parents but does not want to identify with either...is unable to develop moral standards...appears to be indulging in a considerable amount of fantasy in which he perceives himself as a new person with respect and dignity." The clinical impression concluded his running away was related to feelings of insecurity at home and hostility towards his parents, especially his mother. "There does not seem to be undue sibling rivalry."

After completing the second grade, he lost all interest in school (saying later he found it very hard to learn), was conditionally promoted from the third grade, failing the fourth and fifth grades, which he had to repeat.

When he was nine or ten years old, his mother recalled he "...stole money out of the teacher's purse...bought candy for all the kids..." His mother apparently did not know of his imaginary playmates or the quiet thefts, which included an instance of breaking into a home. At that approximate time, he was briefly hospitalized for "leg paralysis", which hospital records diagnosed as "encephalomyelitis."

By now, he was considered a slow learner with no interest in school. He did participate in sports such as baseball, track, wrestling, and sustained a right-sided skull fracture in a discus throwing accident.

After quitting school in the ninth grade, he held brief employment as an unskilled worker and was rendered unconscious when accidentally hit on the left side of the head with a sledge hammer at one of his places of employment.

His family was described as "solid members of the community", none of whom demonstrated any known signs of anti-social behavior. His father worked for many years as a county employee, from which he is now retired. His sisters, brother, and mother have all led normal lives as far as could be determined.

Early Life History - Part II

A police background investigation contacted people who remembered him as a child and teenager. Some of those questioned who were outside the immediate family described him as "...not too bright ... different acting...kind of strange...a loner ...aggressive...angry...a very strange person ...quick-tempered...always in trouble... defiant...known for fast mood changes..." Relatives remembered him as subject to "...mood changes, fast and quick, a loner who exaggerated things and lied sometimes..."

His first wife who said he did not treat her poorly said he was "...a quiet person, (who) never seemed to have friends, (and) always seemed to be getting hurt at work and getting laid off or fired."

His second wife, who was with him after his return from military service in Vietnam, described him as "...quiet, polite, no close friends, a very nervous person, depressed at times who would say he just wanted to be

alone. She also recalled how "...at times he would stare, would be in his own little world, seemed deeper than day dreaming, took three or four minutes to snap out of it..." She remembered his mood changes. "...He'd just get angry on the spur of the moment ...he'd fly into a rage if you said anything to him...he felt that nobody really cares about him. (He) couldn't please his mother and never really knew his father...always wondered if his father was his real father...felt he didn't look like the rest of the family..." to which his former wife added "I wondered because I didn't think he did either."

His third wife, whom he married just weeks before the murder of a 10-year old boy, described him as "...easily angered, had extremely quiet moods, would not talk for hours." He never hit her.

His parents, sisters, and brother, who by now had not seen him in 20 years, thought of him as a "story teller", but had little else to say about him.

Legal History

Six months after quitting the ninth grade and four months after being injured by a sledge hammer, he burglarized a store for which he was adjudicated a youthful offender and placed on 18 months probation. Two years later, shortly after that probation ended, he committed another burglary. A psychiatric report (12/65) said he had a "low normal intelligence" and diagnosed him as an "emotionally unstable personality."

In 1969, having in the interim divorced his first wife, remarried and served in the Army, including 13 months in Vietnam, he burglarized a gas station and committed three arsons, resulting in losses amounting to \$292,000, reportedly because he needed money and was experiencing marital conflict. While in prison for those offenses, a psychiatric report described him as a "schizoid arsonist" and said that "...latent projected homicidal intent in at least two of his arsons should not be underestimated." Five months later (10/ 71) he was paroled to live with his parents who were said "(to be) anxious to help him in whatever way possible."

Six months later (4/72), he remarried for the third time and two weeks later (5/72) became a suspect in the disappearance of a 10-year old boy. He "...vehemently denied

having anything to do with (the boy's) disappearance..." Later that year (8/72), before the remains of the boy were found, a psychiatric social service evaluation, requested by the probation department diagnosed him as "dissocial behavior" and reported that he was unreceptive to (mental health) services. Two weeks later (9/72) he was charged with the rape/murder of an 8-year old girl and subsequently convicted in the deaths of both of the children. These crimes occurred while he was still on probation for the previous burglary and arson. Psychiatric examinations reported him to have "...borderline level of intelligence...with defective moral and social adjustment... an emotionally disturbed individual."

He was sentenced to a 0-25 year sentence for these two manslaughter convictions. While in prison, various psychiatric assessments diagnosed him as anti-social personality, schizoid personality, intermittent explosive personality, and no mental illness. Psychological assessments called him a "...normal psychopathic individual..." whose fantasy life reflected "...deep seated intrapsychic and interpersonal conflicts..." Self revelations about a childhood sexual relationship with a younger sister were sometimes reported as fantasy and other times as a real occurrence.

Although there were documented episodes of violence in prison, where in one instance he set fire to possessions in his cell, by and large, he was regarded as a model prisoner and a role model for other prisoners. For a while, he attended an inmate Vietnam post traumatic stress group, at his request, "...(for) help in understanding the motivation of his crimes (the child murders) and in effectively dealing with his anger..."

In 4/87, he was released from prison under conditions of close parole supervision and mandated mental health treatment. The serial homicides began ten months later. All the victims were killed in different locations and bodies hidden or concealed. The interval between when the victims were last seen alive to when their bodies were found ranged from two days to two months. While all of the murders occurred within an 18 months period of time, the last eight victims were killed in the final four months and the last two victims may have been killed in the

same night.

Medical History

The medical history is a chronology of serious accidents, vague physical complaints, and diagnosed emotional disturbance dating back to early life. At age nine years, he had an episode of "leg paralysis" for which he was hospitalized one week. The cause of this illness remains obscure, perhaps as suggested an hysterical conversion reaction or as also suggested, an attention seeking endeavor.

At age 16, he sustained a right skull fracture and cerebral concussion during a discus throwing accident. At age 20, he sustained another cerebral concussion when accidentally struck on the left side of his head with a sledge hammer. In that same year, he was involved in an automobile accident, again reportedly causing a cerebral concussion. The following year, he fell from a ladder while employed on a construction job. While in prison, he received medical attention for complaints of "...passing out..." Various entries in his medical record referred to episodes of "...syncope...passed out...chest pain and passed out...found on floor...fainting...dizzy, fell down stairwell..." Medical records also referred to complaints of abdominal pains, emotional instability, headaches, and sudden episodes of violence. He receives a 10% disability for numbness in his left hand, said to be related to injury occurring while in Vietnam.

Mental State

Examination revealed a large white male, 6 feet tall, weighing approximately 250 pounds with prematurely grey hair, looking much older than his (then) stated age of 45 years. Despite this, he had the appearance of a physically strong man, accentuated by well developed sloping shoulders and muscular arms. He always walked slowly, spoke in quiet tones, and while outwardly friendly and cooperative, maintained a vigilance about himself as other inmates had reportedly threatened to "get" him.

He had no hesitation in admitting to all the homicides, understood the charges against him, and had already correctly calculated the likely penalty if found guilty. His replies to questions were often lengthy and overly

detailed and his revelations about himself very incriminating and self-defeating. The dominant themes as revealed by him were his preoccupation about his sexual inadequacy, i.e., high libido and low potency, accounts about his personal involvement in Vietnam atrocities, his nearly life-long love and hatred for his mother (whom he perceived as dominating and controlling his father) and his sexual attraction to one of his younger sisters.

He attributed the serial homicides to an "...uncontrollable rage...it wasn't everyone, just certain ones (who) were more aggressive...the first one, she bit me...some tried to rob me...some belittled me...some didn't care...one threatened to tell my wife (about his infidelities)." However, he also believed that two of the victims suspected he was the serial killer. He felt that all the victims "...basically looked alike..." reminding him of his mother, but sometimes also of the younger sister to whom he had always been attracted.

When comparing himself to his siblings and parents, he said he always "...felt different...felt like a stranger in my family...I was different from my sisters and brother...I ain't like the kids (his siblings)...I didn't act like the rest of the kids...I kept after my mother, are you sure I wasn't a doorstep baby..."

The suspicion that he was illegitimate was reinforced by the knowledge that he had a paternal half brother in Australia, an event that occurred during World War II when his father was serving with the U. S. Marines in the Pacific. While in Australia, his father did meet a woman who later confirmed the birth of a son in 1944. He always associated his mother's control and domination of his father with her discovery of this other woman. He felt ashamed at what he perceived as his father's failure to stand up to his mother and, at one point, said: "I always made the statement that I would never let a woman do that to me."

At times he seemed animated and outgoing; at other times, agitated and depressed. He spoke of blackouts since the time he sustained a skull fracture in a discus throw in high school, of fainting spells, headaches, low sexual potency but strong desire, nervousness, chest pains, and mood changes in

which he felt he could not control himself.

"I don't know. I can be as calm and nice as can be and all of a sudden something will tick me off and I get angry and somebody will say something and I get more angry and lose control and strike out...when this other part takes over, it takes control until everything's done and I just calm down. Then I see what happened, there's nothing I can do about it."

He also spoke of having "...strange feelings..." at times. "I don't know...sometimes I fly off the handle and two minutes later I'm back to normal but there were some days that I would be, you know, wouldn't be feeling right...I just get a funny feeling inside...like I can feel a change inside me...I knew I was getting agitated...I knew that something was coming over me that I couldn't control...physically I would get stronger...I just felt like I got bigger...it could happen all of a sudden for no apparent reason...just feel differently...just weird feelings..."

Other aspects of his life, especially his tour of duty in Vietnam (1968-1969) which he depicted as a combat experience with numerous killings and atrocities including cannibalism, could not be corroborated and were interpreted as a reflection of a violent fantasy life.

There was no evidence of delusions, hallucinations, confusion, altered states, clinically documented seizure disorder or post traumatic stress. In terms of cognitive ability, he was not so impaired as not to know the nature and consequences of his actions and that what he did was wrong. However, his hair-trigger temper and loss of control when provoked or under stress in certain situations seemed ominous and clearly dangerous to others.

Psychological Testing

Psychological testing assessed intellectual, personality and diagnostic issues. The Wechsler Adult Intelligence Scale reported a Verbal I.Q. of 88, a Performance I.Q. of 107, and Full Scale I.Q. of 95. A Performance I.Q. significantly above the Verbal I.Q. indicated acting out tendencies, learning disability and likely organic impairment. These tests demonstrated difficulty in processing verbal instructions, verbal infor-

mation, and with abstract thinking.

During the testing, an instance of his hair-trigger temper and poor tolerance for frustration occurred when he had difficulty with one of the subtests (Block Design). The report stated, "He made an angry sweeping gesture across the work surface indicating he would like to...'wipe it all away'...'just blow it away'...his anger grew rapidly and he appeared to lack the verbal skills to explain his feelings...his anger was reduced to physical activity and gesturing...the rapid development of this sequence of behaviors when faced with frustration, perhaps, offers a model for his behavior in other frustrating and angry circumstances." It indicated that he "...can only express his anger through physical acting out..."

The psychological personality assessment described an individual with "...episodic acting out..." and a "truly amazing failure to look at what (he is) doing..." The MMPI suggested the defense mechanism of denial, with hypochondriasis, hysteria and depression scales two standard deviations from mean while the psychopathic deviate scale was three standard deviations from mean. His paranoia and schizophrenia scale revealed an "...alienation from the main stream...", but there was no evidence of a schizophrenic process. The MMPI indicated that he was "...among the most hostile, dangerous and alienated individuals in the community in general...who believes he is plotted against, sometimes feels as though he must injure himself or others, and feels as if things (are) not real..." The Rorschach protocol elicited the response of "a leaf to card four which represents authority and father figures. He saw nothing on card seven, which presumably elicits feelings about mother and maternal figures. Themes regarding sexuality and "evil women" were also noted as well as an observation made many years earlier when he was still a child of seven years. The report said: "...It appears that he harbors strong resentment against his mother..." while at the same time, having "...genuine affection and esteem for her..." Issues associated with health revealed concerns about being overweight, pressure and pain in his head, frequent headaches, faint feelings, dizziness, forgetting things, day dreaming and losing his temper.

The primary diagnosis on psychological testing was anti-social personality disorder.

Laboratory Investigations

Chromosome analysis by SmithKline Beecham Clinical Lab., Van Nuys, California, from a blood sample revealed a 47,XYY karyotype, confirmed by Q banding.

Examination for urinary pyrroles, (kryptopyrroles: normal range 0-20 micrograms percent) as recommended by the Carl Pfeiffer Treatment Center, Wheaton, Illinois, and tested on four separate occasions by three different laboratories (Norsom Medical Laboratory, Harwood Heights, Illinois; Princeton Bio Center, Skillman, New Jersey; and Monroe Medical Research Laboratory, Southfields, New York) were all elevated. The initial level obtained 7/6/90 was 200.66 micrograms percent. Subsequent determinations on 8/17/90 were 87.2 micrograms percent and 25.37 micrograms percent. The last determination on 1/10/91 was 122 micro-grams percent.

Neurological examination was within normal limits. Standard EEG and EEG with nasopharyngeal leads were normal.

C.T. Scan brain reported a slight enlargement left lateral ventricle (considered as perhaps a normal variant), slight atrophy right temporal lobe with absence of the inferior tip right temporal lobe and "...bilateral scars in frontal white matter, more prominent (in) left hemisphere than right..."

M.R.I. brain revealed an old healed right frontal skull fracture, small subarachnoid cyst right middle cranial fossa (without significant effect on adjacent brain), and further confirmation of the C.T. finding of bifrontal scarring, thought most likely due to head trauma.

SPECT (Single Photon Emission Computed Tomography) revealed reduced cerebral perfusion left parietal lobe (an area of the brain which did not uptake or metabolize iodinated amphetamine; a non-functioning area of the brain: Alan M. Burke, M.D., October, 1990, personal communication).

CEEG reported an abnormal brain mapping with "...paroxysmal irritative patterns bifrontotemporal areas, more in the right side..."

Total testosterone was 288 NG/DL (300-1000).

These clinical findings suggested that his aggressive and violent past could be associated with a matrix of genetic, biochemical, neurological, and psychiatric deficits.

Discussion

Genetic Findings

The 47,XYY chromosome constitution is a condition where psychiatric diagnoses such as anti-social, schizoid, emotionally unstable and intermittent explosive personality disorders are frequently made. While there are no distinguishing physical abnormalities which characterize this sex chromosome disorder, approximately 80% of XYY males are significantly taller than normal (6 ft. and over) as compared with XY controls (Nielsen et al, Herstedvester, 1969). This genetic disorder has an estimated prevalence rate of approximately 1 per 1,000 males in the general population and is considered one of the commonest sex chromosome abnormalities found in men (Connor & Ferguson-Smith, 1987). 47,XYY males have an increased risk for behavioral problems as compared to 46,XY males (Thompson & Thompson, 1991), and are at "...some special risk for developing antisocial behavior (Behavioral Genetics, 1982)."

The first report of "...a probable XYY male..." by Sandberg, et al in 1961, was an accidental discovery in a 44-year old man who was suspected of transmitting a hereditary tendency to non-disjunction after his first wife gave birth to a daughter with Turner's mosaic and his second wife to a daughter with Down's syndrome (Moody, 1967, and Hauschka et al, 1962). While there was no reason to suspect a correlation between this genetic abnormality and behavior, other investigators, such as Court Brown (1962) had observed a high frequency of institutionalized males with a related chromosome disorder (Klinefelter's syndrome) who had histories of anti-social behavior. As a result of this observation, Court Brown suggested that "...an abnormal sex chromosome complement may predispose an individual, perhaps in a suitable environment towards delinquency..." The following year, Forsmann and Hambert found a 2% incidence of sex chromatin positive (possessing more than 46 chromosomes) males in a hos-

pitalized population described as "...criminal and hard to manage..." which further supported the likely association between chromosome abnormalities and anti-social behavior.

In 1965, a comparison of data from four surveys which included "...ordinary..." youth who were "...mentally backward..." (Maclean et al, 1962), newborns (Maclean et al, 1964), and patients at the Rampton and Moss Side British State Hospitals (Casey et al, published in 1966), revealed a low incidence of 48,XXYY males among the "ordinary" and newborn population and a high incidence of 48,XXYY among males institutionalized in the state hospitals because of anti-social behavior. This data suggested that individuals with an extra Y chromosome might be predisposed to anti-social behavior. In a study designed to test this hypothesis, Jacobs et al (1965) initiated the first chromosome survey for XYY males among an institutionalized population described as "...dangerous, violent and criminal..." This study demonstrated a significantly higher incidence of men with an extra Y chromosome (3.5%) in this population than might be expected at birth supporting a possible association between the XYY chromosome complement and anti-social behaviors.

Subsequent studies by Casey et al (1966), Price and Whatmore (1967), and Court Brown et al (1968) confirmed the findings by Jacobs et al (1965) and concluded that the extra Y chromosome is associated with anti-social behavior which can begin at a very young age and predispose its carriers to some increased risk for developing a psychopathic personality.

In a series of related studies, the histories of XYY patients indicated they might be at a "...comparatively high risk for committing arson, sexual criminality, and a high frequency of violence (Nielsen et al, Hersted-veste, Denmark, 1969; Nielsen et al, Horsens, Denmark, 1969; and Nielsen, 1970). According to Price and Jacobs (1970), an increased incidence of XYY males in mental and penal institutions indicated that "...the behavior disorders in these men which may exist in the absence of mental deficiency...correlate with a personality disorder...a finding of particular interest as it points to the existence of a constitutional

psychopathic state..."

The significance of these reports was challenged by other investigators who cautioned that no direct cause-effect connection between the XYY chromosome complement and aggressive criminality had been proven (Pitcher, 1971) and that the original findings of Jacobs et al (1965) could simply be "...an improbable event..." (Owens, 1972).

However, after an extensive review of the literature, Hook (1973) concluded that, "...there is a clear association of the XYY genotype with deviance (or deviant antisocial behavior)..." which he defined as "...behavior which leads to or increases the likelihood of placement in a mental-penal or penal setting..." Such a judgement was based on the disproportionately high frequency of XYY men found in security settings compared to their incidence in the newborn and adult populations.

While such an outcome is not inevitable in 47,XYY males, an editorial in *Lancet* (1974) cited chromosome studies in England, Europe, Australia, and the United States, which revealed a 2% incidence of XYY males in maximum security settings, a twenty-fold increase over their 0.1% prevalence rate in the general population and estimated that the "...risk of an XYY male being admitted to one of these hospitals during his lifetime is in the order of 1%. This compares with a risk of about 0.1% for XY males..."

Meanwhile, case reports which addressed developmental issues in XYY children, described them as "...enigmatic in their personality development...vulnerable to simple threats and stresses that most would shrug off...loners...aggressive with fits of temper...(who) plan their activities on an isolationist basis, so that one cannot quite predict what might develop tomorrow or next week..." (Money, 1970). In a study of five XYY children- Zeuthen et al (1975) said: "...it was characteristic that all five males with XYY who grew up in good homes, to a certain extent differed from their ...siblings..." in that they were "...more impulsive, restless, hot tempered, hyperactive ...and lacked control of aggressive impulses..."

Additional childhood features, as observed by Money (1975) revealed that "...at least some XYY boys show behavioral disabil-

ity...(problems in school, loners, impulsive, displaying sudden violence and aggression)...that makes them not only a great problem in family management, but also quite disparate from other family members in their behavior (all) together...XYY individuals are more likely to manifest behavioral disabilities that get them into trouble with society and the law because they infringe on the rights of others...(for whom) society has provided institutions of law and punishment..."

In the reports just cited, the "...key to the behavior disorder (in XYY children) is impulsivity...lack of regulation in behavior...(and)...delayed attainment of behavioral adulthood..." (Money, 1970 & 1975).

An ongoing study of 39 XYY males aged 10-22 years old describe them as tall, thin, awkward, easily excited with low frustration tolerance, distractible, hyperactive, of whom 50% are learning disabled (Dr. Arthur Robinson, personal communication, August 1990).

In a paper which defended the scientific importance of chromosome screening programs, Hamerton (1975) said: "To summarize, about 1 per 1,000 males in the general population have XYY karyotype, whereas in security settings the frequency is 20 per 1,000. The original observation by Jacobs et al (1965) of an excess of XYY males in these population groups is thus amply confirmed..." This paper also made it clear that while "...only a small minority of XYY males spend their lives in security settings...there is little doubt...no matter which way the data is examined, that these males, or some of them, are at a greater risk than XY controls, due perhaps to adverse environmental factors interacting with the genotype..."

A case report and review of the literature (Hoffman, 1977) recommended that "...tall, schizoid, impulsive men with a history of criminality, arson or sexual offenses should be screened..." for the 47,XYY karyotype.

In a special report, entitled "Chromosomes and Violence (1982), Pitcher emphasized that "...only a very few of those with chromosomal abnormalities are at risk of developing mental abnormalities likely to lead them into violent or other criminal behavior..." However, this paper did point out that the criminal behaviors of individuals

with a 47,XYY karyotype "...cover the whole range from minor offenses to violent and sexual offenses and murder..."

"...For (the) XYY, there seems to be little doubt. The extra Y (chromosome) does create some special risk for developing antisocial behavior..." (Behavioral Genetics, 1982).

Biochemical Findings

The discovery of an association between abnormally elevated levels of urinary kryptopyrrole and psychiatric disturbance, a condition later called pyroluria, occurred in 1957 when Dr. A. N. Payza observed an unknown purplish spot on the paper chromatographic study of urine from both volunteers experiencing an LSD model psychosis and psychiatric patients not receiving LSD. In 1958, D. G. Irvine named this unknown substance the "mauve factor" because of its Ehrlich reaction and subsequently reported that this abnormal substance was present in 30-60% of psychotic patients but not specifically schizophrenic (Orthomolecular Psychiatry, 1973; Irvine, 1969).

Studies by other investigators, among them O'Reilly et al (1965) found "...a high correlation..." between the presence of the mauve factor in psychiatric patients and "...thought changes..." defined as paranoid thinking, blocking, delusions, flight of ideas, tangential thinking, clang associations, constricted thought, disordered thought, bizarre associations, and confusion. However, the diagnostic categories associated with this finding included not only schizophrenia but behavior disorders, depression, organic syndromes, neuroses, hysteria, and mental deficiency.

In a following report, O'Reilly et al (1965 b) said that the incidence of mauve positive individuals was "...much higher in emotionally disturbed children and adults than in the general population..." The question raised was whether the mauve factor was a reaction to stress in certain groups of individuals.

After several years of further research, the mauve factor was structurally identified as a pyrrole derivative (kryptopyrrole) whose chemical moiety was present in other chemicals known to be toxic to brain function, such as the porphyrins, LSD and the psychotomimetic tryptamines (Irvine, 1969).

In a study of the relationship between kryptopyrrole, zinc and vitamin B-6, Ward (1975) reported that the level of kryptopyrrole can vary in the same individual, increasing when that person is experiencing more stress, falling "...dramatically..." with large doses of zinc and vitamin B-6 with an associated decrease in stress as the level of kryptopyrrole returns to normal levels.

Kryptopyrrole is an endogenous metabolite, 5 hydroxy kryptopyrrole lactam (A. Sohler, Ph.D. Summary Report to NIH, Grant Number 065-22-5820 (1974), present in humans in either very low amounts or not at all. The normal laboratory range for urinary kryptopyrrole is 0-20 micrograms percent (Norsom Medical Laboratory, Harwood Heights, Illinois; Princeton Bio Center, Skillman, New Jersey; and Monroe Medical Research Laboratory, Southfields, New York).

When this substance circulates in the body, it forms a stable Schiff's Base with pyridoxal phosphate, (the aldehyde form of Pyridoxine or vitamin B-6) and then complexes with zinc, thereby depriving the body of these two essential compounds (Pfeiffer et al, 1974). Both pyridoxal phosphate and zinc are cofactors at the catalytic site of many enzymes. Decarboxylation reactions normally involve pyridoxal phosphate in the synthesis of various neurotransmitters such as dopamine, norepinephrine, GABA, and serotonin while zinc is a cofactor in many enzymes such as lactate dehydrogenase and alkaline phosphate. In addition, both pyridoxal phosphate and zinc are involved in the biosynthesis of heme which is essential to life (Harper's Biochemistry, 1990). As a result, any deficiency in pyridoxal phosphate and zinc can result in medical illness and psychiatric disturbance.

The source of this endogenous pyrrole is thought to arise from an aberrant breakdown product of hemoglobin (Pfeiffer et al, 1970) and when abnormally elevated is associated with diminished stress control, inability to control anger once provoked, mood swings, intolerance to sudden loud noises, and sensitivity to bright lights in individuals who tend to be "night people." (Dr. Bill Walsh, Carl Pfeiffer Treatment Center, Wheaton, Illinois, August and November, 1990, personal communication); an indicator of

mounting aggressiveness in Jekyll and Hyde type personalities who function well in structured settings (like prison) and poorly in the stress of unstructured community life (David Sommerfield, Chief Operations Officer Medi-Lab., Norsom Medical Laboratory, Harwood Heights, Illinois, August, 1990, personal communication). While a direct causal connection with violence has not been proven, a high urinary kryptopyrrole level does "correlate" with low stress tolerance and loss of control (Rhoda Papaioannou, Assistant Laboratory Director, Princeton Bio Center, Skillman, New Jersey, February, 1991, personal communication). Such individuals "...seem prone..." to suicide and are impulsive (Pfeiffer CC and Braverman ER, Biological Psychiatry, 1985).

In a review of patients with elevated urinary kryptopyrroles, McCabe (1980, 1983) listed the following clinical symptoms: progressive loss of ambition, decreased school grades, poor concentration, poor memory, fatigue, hyperactivity, anxiety, depression, psychosis (type not specified), headaches (migraine), diminished sexual potency and impotence in patients who "...showed some degree of psychological decompensation ranging from personality change to frank anxiety, depression, irritability, rages, moodiness, convulsions and uncontrolled excitement. According to Vernon H. Mark, M.D. (Brain Power, 1989), vitamin B-6 deficiency can cause a syndrome of hyperirritability, gastrointestinal disturbance, seizure disorder, and epileptic pattern on EEG.

The urinary excretion of kryptopyrroles is not only increased by stress of any kind (Pfeiffer, 1974) but will also change continually, i.e., increasing and decreasing as a response to heightened or diminished stress (Hippchen, 1978). While some authors believe that elevated kryptopyrroles may be a form of porphyria (McCabe, 1980; Orthomolecular Psychiatry, *ibid*), others consider the presence of abnormally elevated urinary kryptopyrrole a biochemical marker of psychiatric dysfunction rather than a sign of a particular or specific disease.

As a biochemical marker, elevated urinary kryptopyrroles, with its associated nutritional and behavioral implications, can identify individuals at high risk for becoming violent (Pfeiffer, 1987).

Neurological Findings

"A flawed brain, like a damaged computer, seems more likely to provide faulty answers and inappropriate solutions than normal brains" (Elliott, 1984). Neurological examination revealed a patchwork of widely scattered areas of mild brain damage, most likely due to previous head traumas and cerebral concussions. The areas of the brain affected included "slight" atrophy of the left lateral ventricle and right temporal lobe, bilateral "scarring" of the frontal and temporal lobes and left parietal lobe, evidence of an old healed right frontal skull fracture and subarachnoid cyst right middle cranial fossa.

However, the most compelling evidence of neurological impairment was obtained by a computerized EEG which reported the following: "Brain mapping is abnormal. It shows paroxysmal irritative patterns in the bifrontotemporal areas more in the right side." While this finding does not establish a diagnosis of seizure disorder, it is similar to patients who have temporal lobe epilepsy, does establish that brain function is abnormal, and can be considered an additional explanation of this individuals' violent behavior (Turan M. Itil, M.D., Brain Function Monitoring Laboratory, Manhattan-Westchester Medical Services, Tarrytown, New York, January, 1991, personal communication).

Psychiatric Findings

Psychiatric examination revealed that he was "different" from the rest of his family and an enigma to those who tried to understand him in later years. The reports and observations of others who remembered him in childhood and adolescence as a loner, aggressive, not too bright, i.e., learning disabled, a very strange person, different acting, quick tempered, known for fast mood changes, just different from everyone else, are now understood to have been the unmanageable behaviors of a genetically disordered 47,XYY male child.

But perhaps the most significant testimony to his difference from others were his self reports of having always "...felt different...ain't like the rest of the kids...", as if somehow sensing a biologic-genetic estrangement from his family. It is under-

standable that he came to believe that he was either adopted (a "door-step baby") or the illegitimate son of his mother with a "real" father who lived elsewhere.

His unresolved ambivalence towards his mother, a collage of hostility, hatred, affection, and even esteem seemed rooted in his fears of being rejected by her, if in fact he was illegitimate, (which he was not) and intensified by his perception of her domination, control, and humiliation of his father because of the Australia affair. As he said, "I hate and love my mother...hate takes control too much..." while of her relationship to his father, he said: "I always made the statement that I would never let a woman do that to me." In saying this, he provided an insight into the multiple murders. In each instance, "the girls" as he called his victims, all reminded him of his mother when they "...didn't care..." In contrast, prostitutes who handled him with reassurance, were in no danger.

His personal sense of pride and achievement, as recalled by him, came from his physical strength and prowess, as a hunter, fisherman, Vietnam veteran, and earlier in life, as a high school field and track competitor and wrestler. Any sign of impotence, sexual or otherwise, threatened this core self image of his masculine adequacy for which he sought nearly constant reassurance that he was "cared for" and potent. He reacted with rage when this was denied; rage in situations he perceived as threatening to reveal his impotence to others; rage in situations in which he felt demeaned, controlled, and humiliated.

He took refuge in fantasy as a means of defending against his feelings of masculine inadequacy, in which, even as a child, he "...perceived himself as a new person with respect and dignity..." I believe this is the earliest documentation of the "story teller" who, in later years, would deny his personal failure and sexual inadequacy with imaginary figures such as the Vietnam "warrior" who not only committed atrocities, but was heroic in combat, in the image of his father who was a decorated World War II veteran.

His violent behavior and fantasies can also be seen as failed compensatory attempts to maintain control of his fears and anxieties about his personal, i.e., sexual, social, inter-

personal inadequacies, especially when confronted by the stress of having these exposed to others.

The common denominator of violence and murder is stress. Certain individuals under stress with abnormally elevated levels of kryptopyrroles, have a higher incidence of emotional disturbance and achieve symptom reduction when kryptopyrrole levels return to normal (according to O'Reilly), show "...some degree of psychological decompensation" (according to McCabe), "seem prone" to impulsive behavior (according to Pfeiffer and Braverman), and an inability to control anger once provoked (according to Walsh). Such reports cannot be dismissed in view of his history of violence and the unexpected finding of such a biochemical abnormality.

Other aspects of his clinical presentation with reference to his description of having "...strange feelings...a funny feeling inside...weird feelings..." have an uncanny similarity to seizure disorder (Elliott, 1990).

Contrary to usual expectations, he became more violent as he grew older.

Summary

These clinical findings revealed a matrix i.e., that in which anything originates, develops or takes shape of genetic, biochemical, neurological, and psychiatric impairments, which at least partially explain the "...actual inner workings..." of this serial killer. The very earliest warning signs of future anti-social conduct and violence occurred in his childhood. Psychiatric researchers and clinicians have long held that certain types of childhood symptoms of emotional instability predict future adult violence. These symptoms include fighting, problems in school, being a loner, aggressiveness, enuresis, firesetting, cruelty to animals, and truancy. He exhibited many of these behaviors as a child. Whether or not these predictive childhood behaviors are also linked to underlying genetic and/or biochemical abnormality has not, as far as I know, been addressed. What can be said is that long before he committed his first murders of a 10-year old boy and an 8-year old girl, (while in prison for burglary and arson), a psychiatric report (5/71) cautioned (with

reference to the arsons) that "...latent projected homicidal intent (in the commission of those crimes) should not be underestimated..."

The 47,XXX chromosome constitution, referred to as a "...high risk genotype..." (Jacobs, 1975) is associated with a vulnerability to develop aggressive anti-social behavior including violence and murder in a small proportion of susceptible individuals. The presence of abnormally elevated urinary pyrroles further correlates with episodes of rage and violence (McCabe). A damaged brain "...like a flawed computer..." (Elliott) impairs not only judgement but can, in certain situations, disinherit the normal restraints that otherwise regulate and control behavior. Being "different" can lead to alienation and seriously distorted perceptions of relationships, especially in early life. Such a matrix of findings in one individual can reasonable be expected to result in behavioral disturbance. While biological influences do not control behavior or predetermine outcomes, this case demonstrates that criminal tendencies do have biological origins.

References

1. Holmes, R. M., DeBurger J. E. Profiles In Terror: The Serial Murderer. *Federal Probation* (1985): Sep., Vol 49 (3), 29-34.
2. Youngstron. N. Spotting Serial Killer Difficult. *Monitor*, October 1991, 32.
3. Liebman, F. H. Serial Murderers: Four Case Histories. *Federal Probation* (1989): Dec, Vol 53 (4), 41-45.
4. Ressler, R. K., Burgess, A. W., Douglas, J. E. *Sexual Homicide, Patterns and Motives* (1988) Lexington Books, Macmillan, Inc., New York.
5. Mednick, S. A., Finello, K. M. Biological factors and Crime: Implications for Forensic Psychiatry. *Int. J. Law and Psychiatry* (1983): Vol 6 (1), 1-15.
6. Elliott, F. A. Neurology of Aggression and Episodic Dyscontrol. *Seminars in Neurology* (Sep. 1990), Vol 10, No. 3, 303-312.
7. Pitcher, D. R. Chromosomes and Violence. *The Practitioner* (1982), Vol 226, 497.
8. Guttmacher, M. S. *The Mind of the Murderer* (1960). American Book, Stratford Press, Inc., New York.
9. *Democrat and Chronicle* (January 5, 1990).
10. *Democrat and Chronicle* (January 6, 1990).
11. Nielsen, J., Sturup, G. Tsuboi, T, Romano,

- D. Prevalence of the XYY Syndrome in an Institution for Psychologically Abnormal Criminals. Herstedvester, Denmark. *Acta Psychiat. Scand.* (1969), Vol 45, 383.
12. Connor, J., Ferguson-Smith, M. A. *Essential Medical Genetics*, 2nd Edition (1987), Yearbook Medical Publishers, Chicago, Illinois.
13. Thompson and Thompson. *Genetics in Medicine*, 5th Edition (1991), W. B. Saunders Co., Philadelphia, Pa.
14. Behavioral Genetics (1982) Research and Education Association, New York.
15. Sandberg, A. A., Koepf, G. F., Ishihara, T., Hauschka, T. S. An XYY Human Male. *Lancet* (1961), 488.
16. Moody, P.A. *Genetics of Man* (1967). W.W. Norton & Co., New York.
17. Hauschka, T. S., Hasson, J. E., Goldstein, M. N., Koepf, G. F., Sandberg, A. A. An XYY Man with Progeny Indicating Familial Tendency to Non-Disjunction. *American J. Human Genetics* (1962) 22.
18. Court-Brown, W. M. Sex Chromosomes and the Law. *Lancet* (Sep. 1962), 508-509.
19. Forssman, H., Lambert, G. Incidence of Klinefelter's Syndrome Among Mental Patients. *Lancet* (1963), 1327.
20. Maclean, N., Mitchell, J. M., Harnden, D. G., Williams, J., Jacobs, P. A., Buckton, K. A., Baike, A. G., Court-Brown, W. M., McBride, J. A., Strong, J. A., Close, H. G., Jones, D. C. A Survey of Sex Chromosome Abnormalities Among Mental Defectives. *Lancet* (1962), 293.
21. Maclean, N., Harnden, D. G., Court-Brown, W. M., Bond, J., Mantle, D. J., Sex Chromosome Abnormalities in New Born Babies. *Lancet* (1964) 286.
22. Casey, M.D., Segall, L. J., Street, D. R. K., Blank, C. E. Sex Chromosome Abnormalities in Two State Hospitals for Patients Requiring Special Security. *Nature* (1966), Vol 209, 641.
23. Jacobs, P. A., Brunton, M., Melville, M. M. Aggressive Behavior. Mental Subnormality and the XYY Male. *Nature* (December, 1965), 1351.
24. Casey, M. D., Blank, C. E., Street, D. R. K., Segall, L. J., McDougall, J. H., McGrath, P. J., Skinner, J. L. YY Chromosomes and Antisocial Behavior. *Lancet* (1966) 859.
25. Price, W. H., Whatmore, P. B. Behavior Disorders and Patterns of Crime Among XYY Males Identified At A Maximum Security Hospital. *British Medical J.* (1967), Vol 1. 533.
26. Court-Brown, W. M., Price, W. H., Jacobs, P. A. The XYY Male. *British Medical J.* (1968), 513.
27. Nielsen, J., Tsuboi, T., Tuver, B., Jensen, J. T., Sachs, J. Prevalence and Incidence of the XYY Syndrome and Klinefelter's Syndrome in an Institution for Criminal Psychopaths. Horsens, Denmark. *Acta Psychiat. Scand.* (1969), Vol 45, 402.
28. Nielsen, J. Criminality Among Patients With Klinefelter's Syndrome and the XYY Syndrome. *British J. Psychiatry* (1970), Vol 117, 365.
29. Price, W. H., Jacobs, P. A. The 47,XYY Male with Special Reference to Behavior. *Seminars in Psychiatry* (1970), Vol 2, No. 1, 30.
30. Pitcher, D. R. The XYY Syndrome. *British J. of Hospital Medicine* (March, 1971), 379.
31. Owen, D. R. The 47,XYY Male: A review. *Psychological Bulletin* (1972), Vol 78, No. 3, 209.
32. Hook, E. B., Behavioral Implications of the Human XYY Genotype. *Science* (1973). Vol 179, 139.
33. Editorial. *Lancet* (Nov. 1974) What Becomes of the XYY Male? page 1297.
34. Money, J. Behavior Genetics: Principles. Methods and Examples from XO, XXY and XYY Syndromes. *Seminars in Psychiatry* (Feb. 1970), Vol 2, No. 1, 11.
35. Zeuthen, E., Hansen, M., Christensen, A. L., Nielsen, J. A Psychiatric-Psychological Study of XYY Males Found in a General Male Population. *Acta Psychiat. Scand.* (1975), Vol 51, 3-18.
36. Money, J. Human Behavior Cytogenetics: Review of Psychopathology in Three Syndromes - 47,XXY, 47,XYY, and 45,X. *Journal of Sex Research* (1975), Vol 11, 181-200.
37. Hamerton, J. L. Human Population Cytogenetics: Dilemmas and Problems. *American J. Human Genetics* (1976), Vol 28. 107.
38. Hoffman, B. J. Case Report: Two New Cases of XYY Chromosome Compliment and a Review of the Literature. *Canadian Psychiatric Assn. J.* (1977), Vol 22, 447.
39. Irvine, D. G. (1973) Kryptopyrrole in Molecular Psychiatry. *Orthomolecular Psychiatry*, pp 146. Ed. Hawkins, D. and Pauling, L.. W. H. Freeman, San Francisco.
40. Irvine, D. G., Bayne, W., Miyashita, H. Identification of Kryptopyrrole in Human Urine and Its Relation to Psychosis. *Nature* (Nov. 1969). Vol 224, 811."
41. O'Reilly, P. O., Hughes, R. T., Russell, S., Ernest, M. B. The Mauve Factor: An Evaluation. *Diseases of the Nervous System* (1965). Vol 26, 562.
42. O'Reilly, P.O., Ernest, M., Hughes, G. The Incidence of Malvaria. *British J. Psychiatry* (1965 b). Vol 111. 741.
43. Ward, J. L. Relationship of Kryptopyrrole.

- Zinc and Pyridoxine in Schizophrenia. *Journal Orthomolecular Psychiatry* (1975), Vol 4, 27.
44. Sohler, A. (1974). Summary Report NIH Grant No. 065-22-5820. Princeton BioCenter, Skillman, New Jersey.
45. Pfeiffer, C. C., Sohler, A., Jenny, C. H, Iliev, V. Treatment of Pyroluric Schizophrenia (Malvaria) With Large Doses of Pyridoxine and a Dietary Supplement of Zinc. *Journal of Orthomolecular Psychiatry* (1974), Vol 3, No. 4, 1.
46. *Harper's Biochemistry*, 22nd Edition. Appleton & Lamge, Norwalk, Connecticut.
47. Pfeiffer, C. C, Mailloux, B. S., Forsythe, B. A. *The Schizophrenias* (1970) Bio Communications Press, Wichita, Kansas.
48. Braverman, E. R., Pfeiffer, C. C. Suicide and Biochemistry. *Biological Psychiatry* (1985), Vol 20, 123.
49. McCabe, D. L., Kryptopyrrole in Clinical Practice. *Osteopathic Medicine* (Sep. 1980), 43.
50. McCabe, D. L. Kryptopyrroles *Orthomolecular Psychiatry* (1983), Vol 12, No. 1, 2.
51. Mark, V. H. *Brain Power* (1989), Houghton Mifflin Co., Boston, Mass.
52. Pfeiffer, C. C. Observations on the Therapy of the Schizophrenias (1974) *The Journal of Applied Nutrition*, Vol 26, No. 4, 29.
53. Hippchen, L. J. Ecologic-Biochemical Approaches to Treatment of Delinquents and Criminals (1978), Van Nostrand Reinhold Co. New York, New York, Ch. 10, 201-203.
54. Pfeiffer, C. C, *Nutrition and Mental Illness* (1987), Healing Arts Press, Rochester, Vermont, Ch. 10, 71-72.
55. Elliott, F. A. The Episodic Dyscontrol Syndrome and Aggression. *Neurologic Clinics* (1984), Vol 2, No. 1, 113.
56. Elliott, F. A. Neurology of Aggression and Episodic Dyscontrol. *Seminars in Neurology* (Sep 1990), Vol 10, No. 3, 303-312.
57. Jacobs, P. A. XYY Genotype. *Science* (1975), Vol 189, 1044.