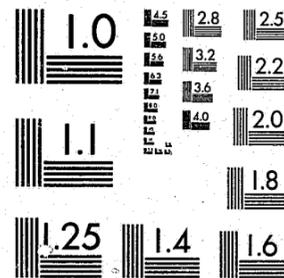


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1980

ANNUAL REPORT

to the California Legislature

U.S. Department of Justice
National Institute of Justice

81109

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January 15, 1981

Willie L. Brown, Jr.
Speaker of the Assembly
Office of the Speaker
State Capitol
Sacramento, CA 95814

Dear Speaker Brown:

The California Commission on Crime Control and Violence Prevention is pleased to submit to you its first annual report to the Legislature, pursuant to the requirements of Assembly Bill 23 (1979--Vasconcellos), Title 9 of the California Penal Code.

I need not remind any of you in the Legislature or any of your constituents, that crime and violence are the issues of the 1980s. The recent wave of homicides and other violent crimes around our state aside, we have more than tripled our criminal justice expenditures in the United States in the last decade--and yet there were more crimes than ever before. By 1985, it will cost more to house an inmate in California than to send a student to a major private university.

Our laws and institutions now respond to violence after it happens. We must, of course, have efficient police forces, prosecutors and a responsive court system; this Commission understands and supports the need for meaningful public safety and the efficient administration of justice. But we must also find ways to uncover the first signs of violent behavior--and develop workable methods to keep potential criminals from becoming violent. The Commission on Crime Control and Violence Prevention is making progress along these lines.

This report will give you a comprehensive picture of the Commission, how we have organized our effort and how we have developed our strategy for discovering and publicizing the root causes of violence and violent behavior. We believe we have arrived at a sensible plan for approaching these questions, one which will be regarded positively under all forms of scrutiny.

We have placed the highest priority on the intense involvement of the public in our process; indeed, we have taken the position that our efforts will not truly succeed without that involvement. While we believe the Legislature and the Governor can act on these problems through policy decisions, it is clear to us that the reduction and eventual prevention of violence will be the result of adjustments, changes and life-choices made by individuals, families and communities.

It is our hope that you will use this report and the Commission as a resource, both in your work as a maker of laws and as a representative of your constituency. We would like to solicit your active, personal participation in our work, particularly at the district level where our Commissioners and supporters are organizing local Violence Prevention Task Forces to focus on local problems.

Sincerely,

STANLEY M. RODEN
District Attorney, Santa Barbara County
Chair, Commission on Crime Control and
Violence Prevention

NCJRS

SEP 8 1981

ACQUISITIONS

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SUMMARY

As a reponse to the alarming increase in violence and violent crime in California, the State Legislature in 1979 created the California Commission on Crime Control and Violence Prevention to look beyond crime containment and corrections programs toward a solution based upon the discovery of the root causes of violent behavior.

At the end of its first year, the Commission has come a great distance toward its three-year goal of producing a coherent set of recommendations and strategies which, when implemented by individuals, families, communities or the state, will help to foster an environment and conditions for the growing of healthy, non-violent human beings.

The Legislature charged the Commission with conducting an examination of the root causes of violence through a process of public hearings and other events, from a comprehensive perspective spanning the entirety of the human developmental process and its biologic, social and cultural environment.

The Commission is 25 California citizens, representing law enforcement, education, mental health, religion, business and labor, as well as women and ethnic minorities, ex-offenders, victims of crimes, and individuals from varying economic and geographic backgrounds.

Four major goals frame the three-year project established for the Commission:

1. To sponsor a series of public hearings throughout the State.
2. To produce a package of strategies and recommendations for action, for changes in environments and conditions, for changes in personal and community behavior, and for new legislation and policy.

3. To widely disseminate the Commission's findings and thus involve large sectors of the California public in efforts toward non violence.
4. To sponsor and assist the development of local Violence Prevention Task Forces in communities around California.

In order to obtain a comprehensive, broad understanding of the latest research findings on the subject of violence causation, we have divided our work into an examination of both the theoretical and the substantive aspects of violence, and have expanded the specific list of issues listed in the enabling legislation.

The first phase of the Commission's investigation involves an examination of theories of violence. Based on our assumption that violent behavior is a product of conditions which can be prevented, the theoretical review will proceed from the biological, through the sociopsychological and the socioeconomic, and culminate in the biosocial. The biosocial perspective, as we conceive it, concerns the interaction between individuals and their various environments. It seeks to examine both the forces in a person's external environment which are conducive to violence and the forces within the individual which make him or her more prone than others to act violently within these environments.

Secondly, the Commission will study specific forms of violence including the causes and effects of the criminal justice system and culturally sanctioned violence such as war, capital punishment and the possession and use of firearms.

We have held two public hearings to date. The first examined the possible relationship between the process of childbirth and early infant "affectional bonding" and subsequent violent behavior. The second hearing featured testimony on the effects of nutrition and other bio-chemical factors on violent and aggressive behavior.

(Complete summaries of both these areas and the hearings associated with them are attached to this report.)

Because only two of nine hearings have been held, and because such a small part of the material on these subjects has been examined, we find it premature to suggest specific recommendations at the end of our first year of work. It is clear that violent behavior is rarely the result of a single cause. Rather, violence emerges from a interactive matrix of influences and can only be affected utilizing a comprehensive approach. An attempt to suggest simple solutions or answers at this time would be a disservice to the Commission and the citizens of California.

Understanding that a major influence on the success of the work of the Commission will be the involvement of the public, we have begun to organize and encourage the development of Violence Prevention Task Forces in communities around the state. These citizen efforts, which currently exist in four counties with plans for several more within the next few months, are designed to enable local communities to use the vehicle and the resources of the state-wide Commission to focus attention on problems with violence and crime at the local level. The Commission members, in turn, look to local task forces for information, opinion and involvement in the three-year effort as we strive to construct our work as a collective project of hundreds and thousands of citizens around the state.

Local task forces currently exist in Santa Clara, San Mateo, Santa Barbara and San Joaquin counties. There are immediate plans for organizing similar groups in San Francisco, Marin, Santa Cruz and Alameda counties.

In addition to the development of local support groups, it will be necessary to

build a dissemination mechanism so that the findings and recommendations, as well as the on-going activities of the Commission, will reach the millions of Californians not able to participate directly and personally in the project. We are working to design a public education effort which will combine the printed word, television programming and other use of media, as well as plans to move information through the school systems and other institutions which touch our lives.

The Commissioners realize that such a publicity effort is not affordable through the use of its operating budget, and so is working to develop an adjunct non-profit corporation to seek and collect funds for the purposes of public awareness and education.

Plans for 1981 include the completion of the public hearings process (by February 1982), the proliferation of local violence task forces, and the personal involvement of a large number of citizens in the work of the Commission. By the close of our work in January 1983, we plan to complete all aspects of our mandate and to create a well-established citizen movement for the reduction and prevention of violence.

I. LEGISLATIVE MANDATE

The Legislature established the California Commission on Crime Control and Violence Prevention during the 1979 session after finding that, in addition to efforts to the criminal justice system and other crime control programs, a state-wide citizens' effort must be mounted to attack the root causes of crime and violent behavior.

In the knowledge that very little information about the causes of violence is readily available to the public, the Legislature created the Commission to "generate an effort to involve and inform the public of the latest research discoveries and developments in the field of the causes of crime and violence, so as to enable individuals to exercise more personal responsibility for crime control and violence prevention." (See AB 23--1979, at Appendix A.)

The Commission's mandate includes the gathering and evaluation of information and research; the conducting of public hearings; the development of conclusions and recommendations which can lead to responsible personal preventative action; and disseminate information about preventative programs to the citizens of California.

II. APPOINTMENT AUTHORITIES AND VACANCIES

AB 23 specified the appointment of 25 commissioners, including the Attorney General or designee; the Secretary of Health and Welfare or designee; and the Superintendent of Public Instruction or designee. The Attorney General, the Senate Rules Committee, the Speaker of the Assembly, the Judicial Council and the Governor divide the remaining appointments. The legislation requires the Governor to appoint two commissioners, each from lists of five candidates submitted by the League of California Cities and the County Supervisors Association of California.

In response to the relatively small number of women and minorities appointed to the Commission, Assemblyman Mel Levine (at the request of Assemblyman Vasconcellos) amended his AB 203 to include a policy statement addressing the need for additional appointments to the Commission. Passed and adopted as Chapter 1370 of the 1980 statutes, AB 203 required that future appointments to the Commission must accurately reflect the population of California with regard to gender and ethnicity. (See text of this section of AB 203 at Appendix B.)

The Commission sits, at this writing, with five vacancies. Commission staff has submitted resumes of qualified women and minorities to the Governor's office for consideration as Commissioner candidates.

III. COMMISSION GOALS

The Commission on Crime Control and Violence Prevention has adopted four major goals to be accomplished during its three year period of existence. They are:

1. To sponsor a series of public hearings throughout the state for the purpose of:
 - (a) Educating the Commissioners and the public concerning the theory and practice of reducing and preventing violence, and
 - (b) Involving citizens personally in the work of the Commission through opportunities to provide public input and testimony.
2. To involve and communicate with large sectors of the California public about the work and findings of the Commission, so that the information generated from hearings and study will be immediately useful to individuals, families and communities, and so that the Commission will enjoy the support of a large and dynamic constituency.
3. To sponsor and assist the development of local Violence Prevention Task Forces in local communities around California, so that citizens and communities may take meaningful action on a local level to bring about the reduction of crime and violence.
4. To produce a package of strategies and recommendations for action, for changes in environments and conditions, for changes in personal and community behavior, and for new legislation and policy. The purpose of these recommendations will be to move the Legislature and the people of California closer to the development of non-violent human beings and a more gentle society.

IV. RESEARCH REVIEW AND FINDINGS

A. Review Conceptualization and Methodology

A thorough grasp of the state-of-the-art knowledge concerning the causes of violence* is essential to our desire to make informed policy decisions and encourage meaningful change. The research component of the Commission's work thus forms the foundation from which it will address its primary goal: involving all Californians in a personal and political movement toward non-violence.

According to its Legislative mandate, the Commission will not engage in or fund original research. It is, instead, in the process of conducting a comprehensive, multidisciplinary review of the extant research in the following broad areas:

- o Birthing/Early Infant Bonding
- o Nutrition and Biochemical Influences
- o Biological, physiological and neurological theories (including sexual and tactile development)
- o Psychological theories
- o Psychosociological theories
- o Early childhood development (including parenting and the family)
- o Learning and modeling theories and other sociological theories (including the influence of prejudice and discrimination)
- o Bio-social theories
- o Cross-cultural perspectives and comparisons

* The Commission's operating definition of violence is: Any act or behavior which results in or is likely to result in harm or injury to oneself, another person, or property.

- o Legal or socially sanctioned violence (guns, war, capital punishment)
- o Sexual violence
- o Homicide
- o Suicide
- o Domestic Violence
- o Mass Media Violence
- o Collective Violence
- o Violence and social institutions (schools, criminal justice system)
- o Juvenile Delinquency

These theoretical and substantive areas evolved from, encompass, and move beyond the issues specified in AB 23. Commissioners and staff have spent arduous hours working out this conceptual framework and feel that it serves the Commission's objectives well.

The first nine areas of investigation examine theories of violence causation. Here the Commission will review extant empirical data toward an understanding of the many forms of violent behavior. Based on our assumption that violent behavior is a product of conditions which can be prevented, our theoretical review will move from the biological, through the sociopsychological and the socio-economic and culminate in the bio-social. The biosocial perspective, as we conceive it, looks at the interaction of individuals and groups of individuals and their various environments. It seeks to examine both the forces in a person's external environment which are conducive to violence and the forces within the individual which make her or him more prone than others to be violent in these environments.

Nine forms of violence, which range from the specific (e.g., homicide) to the general (e.g., juvenile delinquency), will be explored. The Commission also plans to take a look at the causes and effects of culturally sanctioned or legal violence such as

war, capital punishment and the possession and use of firearms.

Several methods are being used simultaneously to collect the information needed to inform the Commission's areas of focus. Staff has instigated computer assisted bibliographic searches to provide a preliminary literature review of each area. This initial review is then used to put together a preliminary summary of findings for the Commission's edification and for use in developing an agenda for the corresponding public hearing. (Hearings are scheduled every other month until February of 1982. See page 24.) These hearings produce important, current data and do much to increase the Commission's understanding and experience of the issues.

Following each public hearing, staff prepares a review summary which combines the results of its on-going, in-depth literature review with the data provided by expert witnesses. Thus far, the Commission has completed two subject areas: Birthing/Early Infant Bonding; and Nutritional and Biochemical Influences on Violent Behavior. (Review summaries for these areas are attached at Appendix C.)

Committed to a comprehensive investigation and still in its inchoate stages, we have found it inadvisable, if not impossible, to include recommendations at this time with each review summary. (The recommendations of expert witnesses are abstracted from hearing testimony and attached to the review summary.) In lieu of specific recommendations, we have issued an executive summary of findings and our tentative position relative to each completed area. (The two executive summaries completed thus far are located at the end of this section.)

To further ensure that the Commission receives the most current information available we issued a "Call for Papers" in July, 1980, to several hundred professional organizations. As a result, inquiries and research literature arrive at the Commission office almost daily from concerned scientists and clinicians around the country. A

similar, expanded "Call for Papers" will be issued in 1981 and 1982.

In November, 1980, a request for research consultants to assist in the massive literature review being undertaken by the Commission was distributed to all University of California and CSUS campuses and approximately 150 private consultants. This "request" has generated considerable interest. Consulting proposals are now being reviewed and it is anticipated that consultant contracts for some of the subject areas will be issued by February, 1981.

Plans for the next two years of investigation and research-related activities are currently underway. We have reviewed two important subject areas, and the information and insights thus gained are being used now to inform the Commission's public involvement efforts. In short, the research review and analysis component of the Commission's task is well-underway and is already being applied to understand and help ameliorate the causes of violence.

B. Executive Summaries and Findings

1. Birth and Early Infant Bonding: Connection to Later Violent Behavior

It will probably remain impossible, given the limits of predictive science and the vast array of conditions occurring after birth which influence a person's personality and behavior, to trace developmental problems and violent tendencies in later life directly to a person's birth experience. It is possible, however, to identify conditions surrounding birth which may contribute to neurological impairment of the child (and thus to behavioral problems) or to subsequent parenting inadequacies.

During the prenatal period, the fetus is biologically vulnerable and chemically sensitive to its intra-uterine environment. Maternal undernutrition, ingestion of alcohol and drugs, intra-uterine infection, and stress are among the extrinsic factors which may impair fetal development. These factors can cause neurological abnormalities in the infant which may result in a subsequent predisposition to violent behavior and may also adversely affect the mother's attitude toward pregnancy, her expectations of the birth process, and her initial interaction with her infant.

During labor, the fetal nervous system is undergoing rapid development, and is highly susceptible to trauma and injury from obstetric drugs and procedures. Tranquilizers, anesthetics, and uterine stimulants administered to the mother before, during and after delivery may be carried to and accumulate in the infant;

medical interventions such as Cæsarian section, forceps removal, and amniotomy subject the infant to additional drugs and the mechanical risks inherent in such procedures. These drugs and procedures are implicated as possible causes of minimal brain dysfunction (e.g. neurological impairment, learning disability, hyperactivity), and there is strong evidence that children suffering from minimal brain dysfunction are prone to engage in aggressive and anti-social activities later in life.

Although rarely critical or irreversable, the events of the hours and days immediately following delivery influence the infants socio-psychological development and the nature and quality of the parent-child relationship. It is during this period that the affectional bond between parent(s) and child initially asserts itself. This early bond then forms the basis of a deeper emotional attachment, the primary social relationship within which the child will develop a sense of self and learn to relate to others.

There is some evidence that extended contact between parent(s) and child at birth may help to reduce the incidence of subsequent parenting inadequacy or child abuse. It may be that modern obstetric practices which routinely separate parent(s) and infant at birth--physiologically, by administering depressant drugs to the mother or subjecting her to unnecessary medical intervention procedures; psychologically, by failing to provide emotional support for the anxious mother; or physically, by actually removing the infant to a nursery for

most of its care, interfere with the parent/child bonding process.

Many of the conditions which put an infant at-risk for neurologic damage or parental neglect can be ameliorated by parental education and supportive prenatal care. The most promising means of eliminating some of the problems inherent in obstetric practices and medical intervention are contained within the "gentle" or "natural" approaches to birth. Ideally, these approaches are designed to create an environment which encourages positive emotional transaction between family and infant. In an overall climate of calm and nurturance, care is taken to maximize parent-infant contact after birth. Birth is treated as a normal physiological function rather than a pathological one. Obstetric interventions are options of last resort. Every effort is made to return control over the birth process and neonatal care to the mother and family. In short, these methods may decrease the risks of unnecessary medications and interventions and may foster greater feelings of attachment between parent(s) and infant at birth.

It is a long way from birth to child abuse and an even longer distance from neonate experience to violent adult behavior. Variables too numerous to measure precede and follow birth and intricately influence an individual's preceptions and behavior. The lack of a direct link between violent behavior and the birth experience does not, however, negate its importance to the study of violence.

Birth is a most intimate and emotional event, a milestone in the life of a family. It is an experience which influences the subsequent relationship between parents and infant and the child's physiological, neurological, and behavioral development. Accordingly, there is reason to be careful that the birth benefits of advance medical technology and pharmacology are not allowed to obscure their potential for harm.

There appears to be little to lose by discouraging the routine use of obstetric medication and medical interventions; encouraging nutritional and psychological health in pregnant mothers, and emotional support for them during labor; and allowing mothers more control over their own birth experience, and the care of their infant. Although research findings and scientific observations remain tentative and contradictory, common sense tells us that much can be gained by re-establishing birth as a joyous, healthy family event.

2. Nutritional and Biochemical Influences on Violent Behavior

The ecologic-biochemical approaches to the prevention and treatment of violent or anti-social behavior are relatively new and highly controversial. The accumulating data, although still primarily anecdotal, are cautiously positive and worthy of attention.

The ecologic component is concerned with the ways in which human beings in interaction with their environment may develop maladaptive patterns which adversely affect their health. The theory is that human beings have evolutionarily adapted to an environment which

has changed considerably. As industrial society progresses humans are increasingly subjected to "unnatural" substances such as chemical toxins, drugs, food additives, and other environmental contaminants to which they may not be evolutionarily adapted and which, thus, may adversely affect their behavior.

The biochemical perspective looks at the way the brain may be affected by substances that are normally present in the brain. Deficiencies or excesses in chemical concentrations may have a negative affect on the behavior of some individuals. The chemical entity related to this area is food and the nutrients contained (or not contained) therein.

Hypoglycemia (low blood sugar)

A number of researchers, clinicians, and criminal justice personnel hypothesize a relationship between hypoglycemia and anti-social and criminal behavior. Few controlled studies have been accomplished to date but anecdotal data abounds which suggests that excessive sugar can have adverse psychological effects, including irritability and aggressive reaction to relatively minor stimuli.

Food Additives

Benjamin Feingold posits a connection between learning disabilities, hyperkinesis and artificial food dyes and colors. Since an association between hyperactivity, learning dysfunction and adult anti-social behavior is fairly well-established and because, if valid, Feingold's hypothesis could help to clarify the relation between nutrition and behavior for general application, it is of importance to this review.

Although far from conclusive, recent experimental studies lend some support to the notion that changes in diet--most specifically the elimination of food additives--may decrease hyperactivity in some children.

Vitamin-Mineral Deficiencies/Dependencies

The human brain requires optimal nutrient (vitamin and mineral) levels for normal brain growth and functioning. If food which supplies these nutrients is not consumed, a vitamin deficiency may result. A certain segment of the population may require vitamins and minerals far in excess of "normal" requirements. A normal, well-balanced diet does not meet their needs. These individuals are said to suffer from vitamin dependency.

Individuals who suffer from such deficiencies or dependencies may exhibit physiological, emotional or cognitive dysfunction. Orthomolecular psychiatry treats the mental disease that may arise from nutrient imbalance by providing the correct molecular environment for the mind, using what has been referred to as megavitamin therapy.

Several experimental and laboratory studies have been conducted in the past few years to scientifically test the success claims of orthomolecular therapists. Reports are somewhat contradictory but, on balance, appear to provide supportive evidence.

"Junk Food" Diets

A number of studies have shown that the diets of many teenage Americans are lacking in adequate nutritional content. Standard

fare for too many appears to be a "junk food" diet of overconsumption and undernourishment. Extreme thiamine deficiency--beriberi--was evidenced by several subjects in one study. Those thus afflicted exhibited increased irritability, aggressiveness and poor impulse control. Proper diet eliminated these disturbing personality characteristics.

It may be that healthy psychosocial functioning can be encouraged just by maintaining proper nutritional balance.

Brain Allergies and Chemical Intolerances

Brain allergy is an unusual or excessive reaction of the brain to a foreign substance. According to numerous clinical ecologists and allergists, brain allergies can be a response to a wide variety of common substances (e.g., food, food additives, dust, pollen, metals, pesticides, plastics).

Since the brain controls perception and behavior, brain allergies may result in mal-adaptive and aberrant reactions. Most commonly manifested by fatigue and headaches, brain allergy may also contribute to anxiety, learning dysfunction, hyperactivity, extreme irritability and hostility.

No definitive data exist connecting cerebral allergy with criminal behavior. Case study data provided by clinicians and some probation officers suggest that the relationship is worth exploring further.

Toxic Metals

The most common toxic metals are lead, mercury, cadmium, and

aluminum. Concentrated and prolonged exposure to them can produce a variety of physiological and psychological symptoms including nausea, fatigue, learning dysfunction and hyperactivity.

A vast literature exists connecting lead toxicity to behavioral disorders. There is also evidence that the lead burden of modern society is increasing--perhaps dangerously so.

The link between biochemistry, nutrition and violent behavior is far from totally understood. A connection does, however, appear to exist; the nature and further implications of which will become clear with continued, judicious application and rigorous study.

Drugs

Drugs, including alcohol, are the chemical substances most clearly implicated in violent behavior. The nature of this association is less clear. Most persons use drugs of one sort or another during their life-time and are never violent; most individuals predisposed to violent behavior are non-violent in most of their interactions with others. Differential responses to drugs depend on the interaction of five factors:

1. drug type: the four primary classifications, determined by pharmacological properties and therapeutic affects, are depressants, stimulants, narcotics and hallucinogens.
2. user personality: with inadequacies in ego functioning, an effort to alter internal experience is more likely--thus, inadequacies in premorbid personality may lead to greater utilization of drugs and to greater potentiality for violence

once drugs are abused. The inadequate, anti-social, passive-aggressive, and psychotic personalities are clearly associated with substance abuse and violence.

3. drug dosage: markedly different psychoactive effects may well occur with dosage variations from low to high levels. Frequency and method of use are also closely related factors.
4. expectations (set): understanding the likely effects of the particular drug, and possessing a non-apprehensive attitude towards or about them will likely reduce the potential for negative reactions, such as aggression.
5. environment (setting): the physical, cultural and interpersonal environments may contain elements contributing to violence. The physical environment may include deprivations causing discomfort and/or frustrations which lead to violence; the cultural environment may include a propensity toward violence; and the interpersonal environment may lack good object relations or the stabilizing influence of concerned others.

Drugs from each of the four classes may be directly related to the occurrence of violence or aggression, but--as a caution--aggressive or violent behavior is most often multi-determined. These relationships are, in order of degree of association:

- o depressants (sedatives, tranquilizers, alcohol): aggression or violence is most likely to occur when the individual has aggressive and sociopathic tendencies and takes medium dosages in social situation.
- o stimulants (amphetamines, Tofranil, Parnate): aggressive or

violent behavior is most likely when the individual has poor impulse control and/or paranoid tendencies, takes high dosages, and is unaware of the paranoid feelings which may occur and has no support from others.

- o narcotics (heroin, codeine, morphine, opium): aggression or violence is not likely to result from the pharmacological properties of these drugs, but may result from criminal activities to procure the drug, panic reactions to withdrawal symptoms, or assaults associated with selling or possession of the drugs.
- o hallucinogens (marijuana, LSD, PCP): aggression and violence are relatively uncommon with respect to the hallucinogens, but may occur when individuals have psychotic tendencies, take high doses, are apprehensive about the experience, or are with persons who alarm them. Even PCP, which is implicated in far more instances of violence than either marijuana or LSD, is probably only violence inducing about 5 percent of the time. Violent episodes on PCP, which are extremely bizarre and dangerous, are probably triggered by high dosages more than other factors.

V. PUBLIC HEARINGS

Assembly Bill 23 requires the Commission to hold public hearings as part of the process of investigating the root causes of violence and disseminating the information collected. Accordingly, we have established a schedule of nine public hearings to cover the broad range of subjects related to violence and violent behavior.

The purposes of the public hearings are two-fold. First, it is necessary to educate the members of the Commission in the subject matter and the existing research within each topic area. Staff provides Commissioners with abstracts and extracts from existing research in the areas, as well as additional reading lists for those with special interests. Expert witnesses, chosen to represent as broad a variety of views as possible, are invited to attend the hearings to make oral presentations to the Commissioners, complete with whatever additional materials, visual aids or other input is appropriate.

Second, the public hearings serve to provide a point of contact for the public with the Commission. At least two hours of every hearing is set aside for public testimony on local problems with violence and crime, as well as the specific subject of the hearing. Moreover, the publicity and resulting participation in the hearings themselves creates a public awareness of the Commission and its mandate; at each public hearing the list of interested individuals and groups has grown tremendously, and the interest in organizing local violence prevention task forces has accelerated in those communities as well.

Two hearings have been held at this writing. The first, held September 27, 1980, covered the question of the effects of the process of birth and early

infant bonding on later violent behavior. The second, held December 4, 1980, explored the effects of nutrition and other biochemical influences on behavior.

The hearing on childbirth and early infant bonding was held at Mt. Zion Hospital in San Francisco, in keeping with the desire of the Commissioners to sponsor public events in areas and communities which are accessible and familiar to the public, as well as "appropriate" to the subject of the hearing. In this case, Mt. Zion is very centrally located in the San Francisco community, and the Commission staff worked closely with the hospital's Alternative Birth Center in designing the hearing and locating expert witnesses.

Approximately 100 people attended the hearing throughout the day.

San Francisco Supervisor Nancy Walker welcomed Commissioners and the public. Assemblyman Vasconcellos gave the keynote address, discussing the founding concepts of the Commission and his hopes for its future and its work.

The University of San Diego was the site of the second public hearing, which generated an attendance of 75-100 people. Clarence Pendleton, Jr., president of the Urban League of San Diego, gave the opening address. He spoke of violence in black and other minority communities, and the conditions which produce it.

Seven additional hearings are planned through February of 1982. The schedule is as follows:

January 29-30, 1981
Cypress College
Cypress (Orange County)

Biological, physiological and neurological theories (including sexual and tactile development)

March 26-27, 1981
Sacramento

Psychological theories; psychosociological theories; early childhood development (including parenting and the family)

May 21-22, 1981
Oakland

Learning and modeling theories; other sociological theories (including the effects of prejudice and discrimination); bio-social theories

July 30-31, 1981

- A. Cross-cultural perspectives and comparisons regarding attitudes, norms and values relative to violence and associated factors (e.g., sex-role rigidity); cross-cultural differences in prevalence and types of violence
- B. "Legal" or socially-sanctioned violence (guns, war, capital punishment)

September, 1981

Sexual violence; homicide; suicide

November, 1981

Domestic violence; mass media violence

February, 1982

Collective violence (riots, gangs); violence and social institutions (schools, criminal justice system), and the ways in which these institutions are victimized by and contribute to violent acts; juvenile delinquency

VI. LOCAL VIOLENCE PREVENTION TASK FORCES

A. Background

While the organization of local groups in support of the work of the Commission is not specifically spelled out in AB 23, we have given this activity a high priority during the life of this Commission.

The stated purpose of local task forces, according to the Commission's definition, is "to facilitate community outreach and communication relevant to the causes and prevention of violence." It is intended that the task forces function as vehicles to involve large numbers of local citizens in activities directed at the prevention of violence or the solving of local problems related to crime and violence.

The development of these groups also serves to create a state-wide constituency for the Commission's work. They work to ensure that the Commission's efforts reflect the needs and priorities of the people of California; to instill a feeling of ownership of the Commission and its work on the part of the citizenry; and to increase the likelihood that the Commission will leave behind an active movement toward non-violence.

B. Santa Clara County Violence Prevention Task Force

The Santa Clara County group, working since August, 1980, will focus its efforts in four major areas:

- o Nutrition
- o Social and economic impact programs
- o Criminal justice institutions
- o Domestic violence

Committees of the Task Force are responsible for each of the above areas, and are meeting regularly to develop training and monitoring programs. Plans call for the establishment of a dietary program at a county boys ranch to remedy violent and aggressive behavior; providing training in effective parenting techniques for community residents; and recommending changes and improvements within the county's jails and lock-ups.

C. Santa Barbara Violence Prevention Task Force

Santa Barbara organized its task force in July, 1980, created committees to parallel the study directions of the state-wide Commission, and set up a schedule of regular meetings.

In December, the group held a community seminar in Santa Barbara on the effects of the childbirth process and early infant bonding on later violent behavior as a follow-up to the Commission's September 27 hearing on that subject.

Plans now call for a one-day county-wide seminar on violence, to be co-sponsored with the Community-Centered Education program in Santa Barbara. With funding from Community-Centered Education, task force members expect to draw 300-400 participants to the seminar.

D. San Mateo County Task Force on Crime and Education

The members of the San Mateo County group are interested in combining a youth and educational focus with a general concern for the prevention and reduction of violence.

The Task Force has prepared a funding proposal for a project to establish a center for services to truant youth, and to extend those services to the

families of those young people. The Task Force assumes that young people who can be given a meaningful alternative to truancy and dropping out will be diverted from vandalism and other behavior which can frequently be violent, and can lead to increasing involvement in crime.

E. San Joaquin County Crime Awareness and Prevention Commission

The San Joaquin Commission has divided its membership into eight subcommittees assigned to the areas of:

- o The elderly and women
- o Legislation
- o Crime prevention
- o Drugs and alcohol
- o Problems of violence
- o Gangs and our society
- o Victims
- o Youth and crime

The 13-member steering committee has charged the subcommittees with responsibility for gathering information and resources on their assigned areas of interest, and for developing recommendations and strategies for solutions to problems to the full steering committee. Reports and recommendations will begin January 22, 1981, and will continue through May.

F. Task Force Activities in Other Counties

As of this writing, four additional counties have planned organizing meetings during the month of January. These counties include San Francisco, Marin, Santa Cruz and Alameda. San Francisco and Alameda Commissioners are involved in organizing interest groups in those counties; Marin and Santa Cruz groups are the result of constituents of AB 23 and those who have attended Commission hearings in December and September and who want to carry on the work of the Commission in their own counties.

VII. PUBLIC EDUCATION AND AWARENESS

A. Proposals for Dissemination of Commission's Work

As stated often in this report, in AB 23, and in other literature and information about the Commission, our topmost priority calls for the Commission's findings and recommendations to be communicated to a large portion of the public in a way which will be immediately understandable and useful. If our final report, or any other communication, travels only from the Commission to the legislature or departments of state government, a most important part of the mandate of AB 23 will go unfulfilled.

To that end, the Commissioners and staff have spent considerable time over the past year brainstorming, researching and developing ideas for dissemination and communication with the public.

Proposals for this phase of the Commission's work include:

1. Publication of Articles - During the next 12 months, the Commission staff will increase production of written material and articles for publication describing the Commission, its methodology and findings. Staff is currently compiling a list of publications, including trade and association publications, professional journals and newsletters, major newspapers and magazines which permit "guest" articles and editorials. Work on the production of articles has already begun.

2. Recruitment of Media Contacts and Outlets - Commissioners and staff have been developing a "media road show" for the purpose of briefing and familiarizing publishers and editors with the Commission. These plans include the scheduling of meetings in large local media markets between media executives and a delegation of Commissioners and staff. We hope and encourage that legislators will participate with us in developing these media relationships in their districts; Assemblyman Vasconcellos has offered to join in this effort as his time and schedule permit.

3. Video and Television Productions - The Commission chair and staff have had several discussions with television producers about the possibilities of producing approximately 12 half-hour television shows (each to cover a major topic of study and the findings of the Commission) for distribution over the growing number of cable television networks around the state. These shows would include portions of the public hearings, as well as in-depth interviews with experts and researchers, members of the participating public, and Commissioners and staff. We believe these productions will communicate a maximum of useful information to viewers in a form exciting and relevant to their immediate lives. The message would include information about changes viewers could make within their own lives and communities to bring about the desired results of reduction of violence and crime.

B. Anticipated Fund-Raising Problems for Public Education

Any public education effort on behalf of the Commission will be costly. Conversations with television producers have resulted in an estimate of \$500,000 for the production of 12 broadcast-quality 30 minute shows, in color, for distribution around the state. This is clearly the most expensive and most effective direction we could take for public education; it is equally clear that funds for such an effort must come from sources beyond the Commission operating budget.

Commissioners have instructed the staff to explore the establishment of a separate not-for-profit corporation to function as a "Friends of the Commission" entity to solicit and collect funds for Commission-related projects. Staff has begun talks with corporate giving officers and foundation officials around the state about possibilities for funding this public education component.

Except for contact with local media outlets near the sites of public hearings, the proposals outlined in this section are still in the development stage. The large-scale distribution of information about the Commission and our work will be a major task for 1981.

VIII. CONCLUSION

We are excited about the first year's accomplishments of the Commission on Crime Control and Violence Prevention, and enthusiastic about the work which lays ahead for the next 24 months.

As we have pointed out in other parts of this report, we look to the citizens of California--and to their representatives in the Legislature--for their involvement and participation in our effort to highlight and impact the causes of violence. Thousands have become involved over the last year, either through the mails, through support for AB 23, or through direct participation in Commission hearings. Thousands more will be directly involved during the next year.

In order to promote the goals of the Commission in the strongest possible terms, we encourage members of the Legislature to participate directly in the development of Violence Prevention Task Forces in their districts. We have found the energy and the interest in the prevention of crime and violence is very high in communities around the state, and it is our hope that the resources of the Legislature and state government which are located in or available to local communities will tap into that interest.

APPENDIX A

Text of AB 23 (1979--Vasconcellos),
bill to create the Commission on
Crime Control and Violence Prevention

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Assembly Bill No. 23

CHAPTER 990

An act to add Title 9 (commencing with Section 14100) to Part 4
of the Penal Code, relating to causes of violence and crime.

[Approved by Governor September 22, 1979. Filed with
Secretary of State September 22, 1979.]

LEGISLATIVE COUNSEL'S DIGEST

AB 23, Vasconcellos. Violence and crime: causes.
This bill would create the California Commission on Crime
Control and Violence Prevention, would specify its composition and
the areas of its study, would provide for the cessation of its existence
on January 1, 1983, and would require it to submit a final report to
the Legislature on or before that date.

This bill would require the commission to apply for federal funds
and would encourage the California Council on Criminal Justice to
provide financial assistance to the commission.

The people of the State of California do enact as follows:

SECTION 1. Title 9 (commencing with Section 14100) is added
to Part 4 of the Penal Code, to read:

TITLE 9. CALIFORNIA COMMISSION ON CRIME CONTROL
AND VIOLENCE PREVENTION

14100. The Legislature finds the following:

- (a) The incidence of violent acts between and amongst our
people continues to grow.
- (b) Violence has become a central, social, and personal issue.
- (c) Current methods are proving insufficient to prevent the
occurrence of crime and violence in our society.
- (d) Our criminal justice system (including criminal penalties and
other methods of crime containment) presently established in law
operates essentially after the perpetration of violence or after the
buildup of the violent personality.
- (e) The government is by itself unable to sufficiently prevent
crime and violence, and active individual personal involvement of
the citizenry of California is essential to this effort.
- (f) It is incumbent upon all Californians, in order to enhance our
chances for a safe society, to explore and discover what kinds of
environments best enable humans to grow healthy, strong, and
gentle, rather than violent.

The Legislature further finds the following:

- (a) There is increasing research being undertaken to search out

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the root causes of violence.

(b) Such research heretofore has been little, if at all, presented to the public and little, if at all, utilized in forming public policy.

(c) It is in our public interest to encourage, foster, and coordinate such research to bring it to more common public knowledge.

(d) A statewide citizens' effort, including public hearings, is the means most likely to accomplish these purposes.

The Legislature therefore intends:

(a) To establish, as a supplement to current efforts at crime control and violence prevention, a long-term preventive approach.

(b) To generate an effort to involve and inform the public of the latest research discoveries and developments in the field of the causes of crime and violence, so as to enable individuals to exercise more personal responsibility for crime control and violence prevention.

14101. (a) There is hereby created in the Governor's office the California Commission on Crime Control and Violence Prevention for the purpose of studying the root causes of violence in our society.

(b) The commission shall:

(1) Identify, review, evaluate, coordinate, and encourage research and other available information relevant to its mission and the areas of study specified in Section 14102, except that the commission shall not directly engage in research activities.

(2) Sponsor and conduct public hearings, conferences and other efforts, collect and disseminate information, and issue periodic reports relating to its findings concerning the root causes of violent behavior.

(3) Make findings, conclusions, and recommendations applicable to its relevant areas of study, as specified in Section 14102, that will assist in the prevention and detection of the root causes of violent behavior. Any such recommendation shall contain a discussion of the immediate and long-term possible impacts of each area of study, as well as specific proposals for immediate implementation, especially looking toward the development of a broader and deeper public awareness of the root causes of, and possible solutions for, crime and violence, and hopefully leading to voluntary, more responsible personal preventative action (rather than governmental mandate), but also including, but not limited to, possible legislation, departmental regulations, funding for research, and other matters of state policy and administration.

(4) Develop a program or a series of programs for immediate and long-term implementation individually and personally by the people of California that will impact upon the root causes and the incidence of violent activities. Such programs shall focus upon preventing the development of the causes of violence and the rehabilitation of individuals, and shall contain recommendations for the effective dissemination and implementation of such programs in the major social, political, economic, and geographic centers of our state,

including but not limited to, the home, the schools, and the work place.

(5) Render advice and information, as requested, to the state and municipal governments, and in response to inquiries by the public.

(6) Annually report its progress to the Legislature by January 15, 1981, and January 15, 1982, and submit its findings and recommendations in a final report to the Legislature on or before January 15, 1983.

(7) Apply to the federal government or any agency thereof, and to any other source or agency, whether public or private, for a gift or grant of funds, up to five hundred thousand dollars (\$500,000), for any of the purposes of this title.

(c) The commission shall consist of 25 members, who shall be broadly reflective of the general public, including ethnic minorities, women, and persons from varying economic levels, and who shall consult with the Attorney General, the Director of Social Services, and the Superintendent of Public Instruction.

The membership of the commission shall include the Attorney General or a designee, the Secretary of the Health and Welfare Agency or a designee, and the Superintendent of Public Instruction or a designee. In addition, the Attorney General shall appoint one other citizen member. Three citizen members shall be appointed by each of the following: the Senate Rules Committee, the Speaker of the Assembly, and the Judicial Council. The League of California Cities and the County Supervisors Association of California shall each provide a list of five names to the Governor, who shall appoint two commission members from each list. In addition, the Governor shall appoint eight more commission members. Each appointing authority shall make the required appointments within 30 days of the effective date of this title.

In the event of a resignation, the inability of a member to continue service, or other vacancy, a new member shall be appointed to the commission by the original appointing authority in accordance with the requirements applicable to an original appointment.

The commission shall elect its chairperson and shall hire an executive director who shall employ such staff as is appropriate. The commission may delegate to an executive committee comprised of its members the responsibility of overseeing the operations of the commission. Such delegation, however, shall not release a commission member from the obligations imposed by this title. Office facilities and other in-kind services shall be provided by the Health and Welfare Agency.

In making appointments to the commission, each appointing authority shall be responsible for appointing persons from different backgrounds, abilities, interests, and opinions to create a balanced commission, reflective of the areas to be studied by the commission. At least one, but no more than five, persons shall be appointed from each of the following: social science, law enforcement, mental health,

education, religion, business, labor, a street level law enforcement officer with at least five years' experience, a victim of a crime, a member of the legal profession, and an ex-convict.

The Governor or a designee shall call the first meeting of the commission within 45 days of the effective date of this title.

Commissioners shall be reimbursed for their travel and per diem expenses.

The commission shall expire January 1, 1983.

14102. The commission shall study the root causes of violent behavior in our society.

The areas of study of the commission shall include, but shall not be limited to, the following:

- (a) The birthing process.
- (b) The parenting process.
- (c) Nutrition.
- (d) Significance of tactile development.
- (e) Healthy emotional development.
- (f) Healthy bodily development.
- (g) Self-esteem.
- (h) Healthy sexual development.
- (i) The effects of television.
- (j) Powerlessness.
- (k) Poverty.
- (l) Prejudice.
- (m) Social and economic environment.

SEC. 2. The California Council on Criminal Justice is encouraged to make funds available to the commission from the state share of federal dollars under its control to carry out the purposes of this title.

APPENDIX B

Text of Section 6.5 of AB 203
(1980--Levine) regarding the membership
of the Commission on Crime Control and
Violence Prevention

minor children.

(f) The amount of unemployment compensation disability benefits which have been paid under or pursuant to the Unemployment Insurance Code in those cases where, pending a determination under Division 4 of this code, there was uncertainty whether such benefits were payable under the Unemployment Insurance Code or payable hereunder; provided, however, that any lien under this subdivision shall be allowed and paid as provided in Section 4904.

(g) The amount of unemployment compensation benefits and extended duration benefits paid to the injured employee for the same day or days for which he receives, or is entitled to receive, temporary total disability indemnity payments under this division; provided, however, that any lien under this subdivision shall be allowed and paid as provided in Section 4904.

(h) The amount of indemnification granted pursuant to Article 1 (commencing with Section 13959) of Chapter 5 of Part 4 of Division 3 of Title 2 of the Government Code.

SEC. 6. Sections 1 and 1.5 of this act shall remain in effect only until December 31, 1981, and shall be repealed as of such date, unless a later enacted statute, which is chaptered before January 1, 1982, deletes or extends such date.

SEC. 6.5. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting such necessity are:

The Legislature finds that the membership of the California Commission on Crime Control and Violence Prevention must be increased to appropriately reflect the general public, including women and ethnic minorities, and that there exists a compelling need for the express inclusion of women and women who are ethnic minorities as commission members to enable the commission to successfully carry out its mandate, and therefore it is necessary that this act become effective immediately.

SEC. 7. No appropriation is made by this act pursuant to Section 2231 or 2234 of the Revenue and Taxation Code or Section 6 of Article XIII B of the California Constitution because the only costs which may be incurred by a local agency or school district will be because this act creates a new crime or infraction, changes the definition of a crime or infraction, or eliminates a crime or infraction. Furthermore, this act does not create any present or future obligation to reimburse any local agency or school district for any costs incurred because of this act.

APPENDIX C

Review summaries of research data

1. Birthing and Early Infant Bonding: Effects on Violent Behavior Later in Life
2. Nutritional and Other Bio-Chemical Influences on Violent and Aggressive Behavior

Birthing/Early Infant Bonding Influences on Violent Behavior

It will probably remain impossible - given the limits of predictive science and the vast array of conditions occurring after birth which influence a person's personality and behavior - to trace developmental problems and violent tendencies in later life directly to a person's birth experience. It is possible, however, to identify conditions surrounding birth which may contribute subsequently to parenting inadequacy (child abuse or neglect) and/or physiological, neurological or behavioral developmental problems on the part of the child.

In its attempt to identify those conditions, the following summary addresses, sometimes simultaneously, four interrelated issues: 1) The extreme vulnerability and sensitivity of both mother and infant to their environments - prenatally, during delivery, and in the hours and days immediately following birth; 2) the effects of certain environmental conditions on the development of the child and the parent-child relationship; 3) the significance of the primary relationship or bond between mother and infant; and 4) the possible implications of interfering with the early bonding process due to the lack of parent-infant interaction at birth.

EARLY PARENT-INFANT BONDING

The events of the hours and days immediately following delivery influence the infant's socio-psychological development and the nature and quality of the parent-child relationship. It is during this period that the affectional bond between parent(s) and child initially asserts itself. This early bond then forms

the basis of a deeper emotional attachment, the primary social relationship within which the child will develop a sense of self and learn to relate to others.

Klaus and Kennell (1976) define this attachment as a unique relationship between two people that is specific and endures over time, and they use behaviors such as eye-to-eye contact, fondling, breast feeding and kissing as operational measures of mothering and maternal-infant attachment. It is important to remember when reviewing all of the research on bonding, that a distinction exists between attachment and what researchers have deemed attachment behaviors.

According to H.F. Harlow, a person is involved in a number of affectional systems throughout his/her lifetime. These systems "bind together various individuals within a species in coordinated and constructive social relations." (Harlow, 1978:28F) The maternal-infant attachment is but one of these systems but the fact that it is crucial to the survival and development of the infant lends support to the theory that it may be the strongest of human bonds.

Studies involving non-human mammals (rats, sheep, goats) have found evidence for a critical period for development of the maternal bond within three hours after birth. Periods of separation as short as thirty minutes were shown to modify maternal behavior; and mothers were more likely to partially reject their infants when tested after three months. (Hersher et al., 1963; Rosenblatt, 1975) Studies completed with primates, however, have been unable to find evidence as convincing with regard to a critical period in higher mammals (Suomi et al., 1972; Mason, 1974) Harlow's experiments with primates showed that separation after birth adversely affected the infant's behavior during isolation and the interaction between mother and infant when they were rejoined. More important, however, he found that these

adverse effects were reversed provided the infant was reunited with its mother within three months of birth. (1979:244-255)

Although maternal and infant behavior differs enormously between species, it would probably be a mistake to discount the importance of the period surrounding human birth. The heightened sensitivity of the mother after delivery and the neonate's capacity to respond make it likely that the first hours and days are important in laying the foundations of the subsequent mother-child relationship.

Recent scientific observations have verified what mothers giving birth in natural settings have probably always known, newborn infants are extremely alert and receptive to stimulation. Neonates are also able to discriminate sizes, objects and the face and voice of their mothers. (Carpenter, 1974; Brazelton, 1978; Roth, 1980) More, they reciprocate with behavior such as "gazing, imitating, crying, listening, startling at a loud noise, following with (their) eyes, clinging, and body movements." (Young, 1978:2)

Thus at birth there exists an opportunity for reciprocal interaction between infant and parent(s), with infant and parent(s) influencing each other's attitudes and responding to each other's messages.

"As the social exchanges between the mother and baby continue, the responses of the baby reinforce the mother - and create in her an ever-increasing commitment to her baby; the baby, in turn, learns from the mother's responses how his needs will be answered. When her communications are reassuring and pleasurable, this will help develop the child's fundamental trust and sense of security. If, on the other hand, the mother then responds with rejection or hostility, this can have a detrimental effect on the child's physical and emotional development." (Young, 1978:3)

Summarizing the results of eleven studies, including his own, Klaus concludes that "no matter when increased amounts of contact between mother and infant are added in the first three postpartum days, there appears to be improved mothering behavior." (Klaus, 1978:200)

He is, however, cautious about positing that this sensitive period is critical to infant-maternal bonding because "critical" implies an all-or-nothing condition, a one time opportunity for attachment.

"There is strong evidence against a "critical period" theory. For the past thirty years in many hospitals in the Western World, mothers and infants have had minimal contact, yet most parents have provided adequate parenting... For the survival of the human infant, mother-to-infant attachment is essential. It would thus seem unlikely that such a life-sustaining relationship would be dependent on a single process." (Klaus, 1978)

THE BIRTH EXPERIENCE

Modern Western medicine in its highly successful efforts to reduce peri-natal disease and infant mortality, has increasingly interfered with the first social interactions of parents and their newborn babies, and may also be responsible for doing some harm to the genetic and neurologic integrity of some neonates.

Pre-Natal Influences:

Neonatal behavior, according to T. Berry Brazelton "results from interaction between the genotypic behavior with which the infant is endowed and the shaping of it by intrauterine and peri-natal experience." (1979:279) During its intrauterine life, the fetus may be exposed to a number of environmental factors which may affect its subsequent development and behavior. The placental membrane, once considered an impermeable wall or barrier which protected the fetus from external intrusions, is now acknowledged to more closely resemble a sieve through which nutritive materials and other products in the mother's blood are passed on to the infant. Among the extrinsic factors which may adversely influence fetal development are undernutrition in the mother, drugs, alcohol, and obstetric medications ingested at critical times, and intrauterine infection and stress. Any of these factors can trigger neurological or physiological abnormalities in the infant which may predispose him or her to aggressive behavior or encourage hostility

or rejection on the part of his/her parents.

The biological and hereditary structure of an individual is expressed through genes. Genes constitute the limits of the individual's potential for development. As Brazelton (1970) and others (Thompson, 1955; Money, 1968) point out there is considerable research evidence to show that the expression of the genotype is heavily influenced by prenatal factors which, by altering the cellular structure of the fetus, may produce effects which later environmental influences cannot overcome.

A study by Money et al. (1968) lends dramatic support to this notion of cellular "points of no return." Money studied 10 patients who had the typical XY chromosomes of a male; but who had the external appearance of females at birth, and developed into healthy and well-adjusted female adults except that they were unable to reproduce or lactate. This condition, known as fetal feminization of a male, is brought about by an insensitivity of the fetus to the male hormone androgen - which leaves the fetus sensitive to the female hormones circulating in the mother. Androgens administered after birth did not reverse this condition; intrauterine conditioning of female hormones had essentially changed the male genotype into a female genotype for life - behavior and all.

Mother's diet can have a profound effect on her feelings of self-esteem and autonomy and thus influence her attitude toward pregnancy, her expectations of the birth process, and her initial interaction with her infant. Furthermore, there is some evidence to indicate that malnutrition in pregnant woman may lead to a decrease in brain cell quantity and brain cell protein in the offspring. (Samenow, 1978) Offspring thus affected may be "poorly adapted to normal development and must be more susceptible to any insult, however mild, of hypoxia, maternal depressant drugs and other paranatal events." (Brazelton, 1970:96)

The use of alcohol and other drugs can adversely effect the fetus and the infant's subsequent development, physically, mentally, neurologically, and behaviorally. Children who suffer from "fetal alcohol syndrome" -- an adverse reaction to alcohol exposure in utero -- exhibit learning disability, poor coordination, irritability in infancy, and hyperactivity in childhood.

(Streissguth, et al., 1976; Hanson, et al., 1976; Smith, 1979)

The influence of environmental contaminants on fetal development is receiving increased scientific attention. Khera and Clegg (1969) have studied the effect of pesticides on the fetus and neonate of birds and animals. They found intracellular damage in the developing fetus. According to Brazelton (1970) there is every reason to suspect similar damage in human infants since "human" maternal and infant tissues store pesticides, and there is a concentrating increase in maternal milk in the human.

Peter Levine (1978) theorizes that "in utero" stimulation may be a critical factor in preparing the newborn to respond appropriately. Maternal stress during pregnancy could affect the developing fetus by causing spontaneous fetal nervous activity to be suppressed. This in turn might result in inappropriate brain stem and aberrant stress patterns... (which)... could dispose the infant to a wide range of stresses' and subsequent developmental disabilities as well as unrealized potential." (Levine, unpublished paper, 1978:2) This notion is not new. As early as the 1940's there has been experimental and clinical evidence to support the thesis that congenital defects, "neuroticism" and hyperactivity, may be produced in the infant because of emotional stress undergone by the mother during pregnancy. (Sontag, 1941; Montagu, 1950; Fraser and Feinstat, 1951; Wilson, 1954; Thompson, 1955)

Madeline Shearer in her testimony before the Commission on Crime Control and Violence Prevention (CCCVP, 1980) emphasized the preventive approach to intra and post natal problems. According to Shearer, one of the most effective ways of minimizing risk to mother, child and their relationship is the maintenance of community based store-front clinics which educate parents to the dangers to the fetus of malnutrition, drugs, alcohol and other intrusive conditions.

Perinatal Influences

A mother who is heavily sedated or unconscious will obviously be unable to initiate interaction with her baby or respond to her baby's advances. Tranquilizing drugs and anesthetics given to the mother during birth may collect in the baby's bloodstream and central nervous system causing less responsive or depressed infant behavior. Interaction between infant and parents may thus be hindered and the early bonding process adversely affected.

It was concern for this type of subtle interference with initial mother-infant relations that motivated Brazelton (1961, 1965, 1970) to study the effects of perinatal drugs on neonates. Brazelton has found differences in behavior of newborns depending on the intra-labor medication given the mother. Inhalent anesthesia given to the mother affects the infant relatively little. Barbituates, on the other hand, decreased the responses of the babies significantly. He also found a 24-48 hour lag in the ability of these neonates to adapt to breastfeeding.

It is important to note that these abnormalities showed up after an Apgar evaluation at birth pronounced the infants normal and in excellent health. An Apgar test is a scale developed to neurologically assess infants at birth by measuring heart rate, aspiration, muscle tone response and skin color. As an

indicator of only the most gross abnormalities, the scale is increasingly being questioned as an adequate indication of infant health. (Coletti, 1979; Haire, 1980)

In a recent comparative study of neonate behavior, Brazelton et al. (1979) found that middle-class infants whose mothers had been given spinal or epidural anesthesia and pre-delivery medication performed significantly poorer in motor process dimensions than the "drug free" lower SES group.

Another important study by Gerald Stechler (1964) showed reduced attention to stimuli (decreased length of looking-time) on the part of infants whose mothers had received a depressant drug within 1½ hours of delivery. Shnieder and Moya (1964) found significant central nervous system depression, as measured on the Apgar scale, in newborns when meperidine and secobarbital was given to their mothers one to two hours before delivery. Borgstedt and Rosen (1968) found that sedative or narcotic medication given mothers during labor was correlated with the behavior and EED patterns of the newborn for up to three days after birth; and R.E. Kron and his associates (1966) found that infant sucking behavior was reduced as a result of obstetric sedation. These findings are important on their face because of their implications for early bonding. They are also important because they suggest that neurologic damage to the infant may result from obstetric procedures administered during birth.

There is some evidence to indicate that neurologic disability among children is shockingly common today. In their study of middle-class kindergarten children Silver and Hagin (1976, as cited in Haire, 1980) found more than half of the children tested evidenced some form of learning disability, from subtle to gross brain dysfunction. This finding is especially important to the study of aggression and violence because children who suffer from "minimal brain dysfunction" (a catch-word term which includes learning disabilities and hyperactivity) appear

to be more prone to aggressive, "anti-social" behavior in later life than neurologically healthy children. In their younger years these children often exhibit violent behaviors - tantrums and outbursts of rage and aggressiveness in response to minor changes in routine or moderate demands. (Birch, 1973) Perhaps more important to their subsequent adult behavior is the reaction they elicit from others. Their fleeting attention spans, highly unpredictable conduct, and rapid shifts in mood often bring negative reactions from family, peers and teachers which reinforce the child's negative, deviant self-image and initiate a lifetime cycle of anti-social behavior.

The potential for neurologic damage to newborns as a result of obstetric drugs and procedures was addressed by Doris Haire in her testimony before the Commission on Crime Control and Violence Prevention (1980.) According to Haire, a person's brain is more vulnerable to trauma and injury during the hours which surround birth than at any other time.

"The nerve circuitry of the brain and the central nervous system of the fetus is rapidly developing as labor begins, making these awesomely complex structures vulnerable to permanent damage from the drugs and procedures administered to the mother during that time. Drugs administered to the mother during labor rapidly filter through the placental membrane and enter the blood and brain of the fetus in a matter of seconds or minutes. While the fetus is connected to the mother's circulatory system, her system helps to eliminate the drug from their two systems. However, if a drug is frequently or continuously administered to the mother during labor, there is a tendency for the drug to accululate in the maternal and fetal blood and brain due to overload...

Once the infant is born and the cord is clamped, those drugs are essentially trapped in the infants circulatory system. Because the newborn's metabolic and endocrine systems are miniatue the infant cannot breakdown and excrete the drugs. The trapped drugs or their potent metabolies may continue to circulate in the newborn infant for several days or longer." (Haire, 1980:18)

Drugs administered to the mother during labor can depress her central nervous system and interfere with the transfer of oxygen from the mother's circulatory system to the unborn infant. This may result in fetal hypoxia - lowered oxygen saturation of the fetal brain. (Haire, 1980) A study by L.E. Ucko (1965) found

no significant developmental differences up to 5 years of age between boys who were "asphyxiated" (lack of oxygen to the brain) at birth as opposed to those who were "non-asphyxiated." He did find, however, that Group A ("asphyxiated") boys exhibited a high degree of sensitivity, and "higher reactivity," often violent in nature, to stressful situations; it appeared that "the children's feelings of security (broke) down, temporarily, everytime when faced with an unfamiliar situation." (Ucko, 1973:198)

Uterine stimulants administered to women in labor to augment their contractions can also adversely affect the fetal brain by increasing intracranial pressure and by inhibiting the normal transfer of oxygen from the mother's circulatory system to the fetal brain (Haire, 1980). Although it has yet to be determined how long the fetus can sustain subtle oxygen deprivation before permanent brain damage occurs, there is an increased likelihood in such instances that brain cells may die.

Some risk to the infant's neurological integrity may stem indirectly from the administration of drugs to the mother. Epidural or regional anesthesia may prolong or disrupt labor and thus encourage additional use of drugs to promote labor. If labor is curtailed to the point where Cesarean section is required the fetal brain will then be subjected to the greater levels of drugs which accompany major surgery. According to Haire (1980) data from England show that an infant born to a mother who has had an epidural block is more likely to be delivered by forceps. Forceps removal, of course, further increases risk of trauma and injury to the infant. R. Caldeyro-Barcia (as cited in Haire, 1980) has demonstrated that obstetric interventions such as amniotomy, the artificial rupturing of the amniotic sac which encases the fetus, "can greatly increase intracranial pressure and cause a marked disalignment of the bones of the skull and increase the likelihood that membranes which separate and support the area of

the fetal brain will be strained to the point of tearing." (Haire, 1980:23)

Psychopharmacological agents given to mothers before, during and after birth may reach infants of nursing mothers. Specifically such drugs as diazepam, lithium, bromides and opium alkaloids are known to be excreted in breast milk. Although the effects on infants of ingestion of such drugs are not yet fully understood, there can be no doubt that the neonate suffers some side effect. (Anath, 1978)

Despite the tendency of the medical community since the early 1900's to treat childbirth pathologically, as reflected in the use of drugs and complicated birthing procedures, childbirth is not a disease; and although there will always be some necessity for obstetric intervention, most women are capable of giving birth without complicated medical intrusion. Due not to lack of concern but to its overconfidence in and fascination with sophisticated new technology, the medical profession may be promoting practices which are detrimental to infant health. As Brazelton warns,

"The subtle subclinical effects on developing embryonic tissue and on sensitive neural organization in the fetus and neonate may be of lasting effect on development. Watching a drugged mother and a depressed infant who must make a go with each other should make us re-evaluate the "routine" use of premedication and anesthesia at delivery, in the light of its effects on the early mother-infant interaction, as well as its lasting effect on the subsequent outcome of their lives together." (Brazelton, 1970:430)

Other aspects of the birth experience also require--and are receiving--re-examination for the ways in which they may affect parent-infant bonding and child development.

Parent-Infant Separation at Birth

Ironically, birthing procedures, which today appear cruel and barbaric, were introduced because of well-intentioned, humane concerns. Severe policies of

isolation and separation were adopted by hospitals in the early 1900's to protect healthy babies from infection. As recently as the 1940's newborns and their parents were totally separated during hospitalization. (Klaus and Kennell, 1976)

After World War II these severe practices were challenged (Mittler, 1948; Kahn, 1949) and elimination of isolation procedures was not found to increase rates of infection. Even so hospitals have been slow in changing their deeply institutionalized policies. A nationwide study by Clivord Barnett and associates (1970) reported that only 30 percent of hospitals surveyed permitted mothers to enter nurseries; and in only 40 percent of these hospitals were mothers permitted to touch their babies in the first days of life.

"...most normal births in the United States are associated with several days of deprivation for mother. A woman who delivers a premature infant suffers complete separation from her infant for at least the first day, since typically, even after the first day she only sees her infant through a glass window. Only mothers who deliver their normal full-term infants at home and live with the infants from birth experience no deprivation." (Klaus and Kennell, 1976:8)

Concern for the possible ramifications of this separation on maternal-infant bonding has led to numerous studies over the past 15 years. Marshall Klaus and John Kennell, motivated by their observations of premature infants who later returned to the hospital battered and abused, have pioneered much of the research in this area. They hypothesize that if a sensitive bonding period does exist, obstetric and hospital practices which separate infant and mother immediately after birth may later the quality of the maternal-infant bond and encourage parenting inadequacy.

The findings of Klaus and Kennell (1970, 1972, 1974, 1975, 1976, 1977) and others (Carlsson et al., 1970, 1979; Ringler et al., 1975; Le Chateau, 1977a, 1977b, 1979; Hales et al., 1977; Campbell et al., 1979; O'Connor et al., 1980; Peterson

and Mehl, 1978) appear to support the hypothesis that "extra" contact influences subsequent parenting behavior in a positive way and are consistent with the theory of a sensitive, if not critical, phase following birth which affects bonding. Several studies, however, fail to find much evidence in support of this extra contact theory. More accurately they fail to show long-term differences in mothering behavior as a result of early, extended contact and suggest that variables other than separation play a more significant role in the mother-infant relationship. (Campbell and Taylor, 1979; Carlsson et al., 1979; Siegel et al., 1980; Leiderman et al., 1973, 1975, 1980)

Herbert Leiderman and his associates (1973, 1975, 1980) conducted a controlled, longitudinal study of 72 white middle-class mothers, fathers and their infants and found evidence that early separation of mother from infant did affect maternal attitude (e.g. less commitment and self-confidence in the mothers of the separated group). They also found that these attitudinal differences had disappeared one month after discharge from the hospital. Maternal behavior was also different between groups with the early separation mothers and infants exhibiting less ventral-to-ventral contact. These behavioral differences had disappeared one year after discharge.

The Leiderman et al. study controlled statistically for the influence of variables other than degree of contact and found that the family's SES, and infant characteristics such as play behavior and gender played a more important role in differentiating the maternal behavior of the contact and non-contact mothers than did initial experiences of non-separation or separation. According to Leiderman, "... (the) inescapable conclusion is that even after the initial two or three months of separation from their premature infants, mothers do establish social bonds which cannot be differentiated from the bonds established by the mothers of prematures and full-term mothers who initially were not separated

from their infants." (Leiderman, 1980:13)

Leiderman speculates that some of the discrepancy between his findings and those of Klaus, Kennell, and others may be due to the non-comparability of the populations researched. Many researchers into this area have used lower SES subjects while Leiderman's families were educated and middle-class. Thus, some of the differentiation in study outcome may be attributable to "the greater potential for gain by an economically and socially deprived urban group where relatively small modification in the hospital environment could have a very large subsequent effect, and the much lower potential for gain within a middle-class population." (Leiderman, 1980:16)

A comparative study of Greek neonate behavior conducted by Brazelton et al., (1970) calls this hypothesis into question. Three neonate groups were compared using the Brazelton neonatal behavioral assessment scale:

- 1) Newborns living in an orphanage were isolated in brightly lit cubicles, fed on a four-hour routine and received little extra stimulation;
- 2) Middle-class infants; and
- 3) Lower SES infants.

The latter two groups were fed on demand, lived at home and interacted continually with family members.

The orphanage infants exhibited the poorest performance in most test areas, including alertness, motor maturity, and general activity. The variable which appears to be most accountable for this poor performance was social isolation, not SES. The lower and middle class infants has similar scores on most test items.

A recently published study by Seigel et al., (1980) suggests that differences in findings may be due more to differential statistical analyses than to subject populations. Seigel and associates, using a population of low-income women (N=321), found that extra contact after delivery facilitated mother's acceptance of her child and increased her consoling behavior toward the child at four months. At twelve months they found "positive" infant behavior correlated significantly with degree of contact at birth.

When other variables were controlled, however, Siegel like Leiderman found variables other than separation to be more important to the quality of the mother-infant relationship. In addition to assessing the level of statistical significance (as is the case in most of the other research studies) Siegel and his associates analyzed the amount of variance in maternal attachment explained by early, extended contact. They found maternal characteristics and other "background" variables accounted for most of the variance between contact and control group mothering behavior. Further, when maternal characteristic variables were controlled for the Siegel et al. study found no significant relationship between extended contact, home visit interventions, and child abuse.

One of the most recent studies to find some evidence in support of early and extended parent-infant contact, is a controlled study of 301 families in Tennessee conducted by Susan O'Connor and her associates. These families were followed for seventeen months to test the hypothesis that "increasing contact (at delivery) between healthy primigravidous low-income parents and their normal newborns might reduce the incidence of parenting inadequacy." (1980:176)

Rooming-in (extra contact) was found to be correlated with fewer subsequent cases of parenting inadequacy --ten "routine contact" children experienced neglect of abuse compared with two "extra contact" children. This study did not control

for maternal characteristics or other background variables.

O'Connor speculates that rooming-in may make a difference because, as suggested by Sanders et al. (1970), it permits early adaptation between infant and parents, with a minimal amount of intermediate stress to either.

"If the caretaker involved is one who is predisposed by past experience and current stress to inadequacy in parenting, these initial difficulties of early parenthood which most parents successfully overcome might initiate the cycle of parent and child behaviors which lead to maltreatment. Rooming-in may be effective in reducing subsequent parenting inadequacy by bonding the parent and infant into reciprocal regulation from the very outset, with the consequence that the exchange of positively reinforcing behaviors between parent and child is maximized and the cycle of child maltreatment avoided." (O'Connor, et al., 1980:182)

O'Connor emphasizes that 90 percent of the mothers who did not receive extra-contact or rooming-in provided adequate parenting and concludes that "although rooming-in may enhance the mother-infant relationship to some degree, its absence usually is not associated with demonstrable harmful effects." (1980:182) The flip-side conclusion, given that two extra-contact children suffered abuse, is that although extra-contact at birth may contribute to parent-infant bonding it is not sufficient to prevent parenting disorders or child abuse.

OTHER INFLUENCES

As has been suggested, numerous factors other than the degree of contact between mother and infant at birth influence the quality and intensity of the maternal-infant attachment, including: the baby's gender, genetic tendencies, and initial responses to its new environment; mother's genetic make-up, personality, and personal sociocultural history; mother's previous pregnancies and birth experiences; attitudes toward and expectations of birth, and conditions surrounding the birth in progress.

A positive childbirth experience helps to create in the mother an increased self-esteem and self-confidence that may foster maternal bonding. On the other hand, a negative birth experience, where fear and pain predominate, may adversely affect a mother's feelings toward her child; at least for a time, she may harbor feelings of resentment and hostility toward the object associated with that pain and discomfort.

Alternative Birthing Strategies and Environments

Alternatives to traditional hospital birth are becoming increasingly available. Births now take place in alternative birthing centers located within hospitals, in independent community facilities and, once again, at home. These alternatives offer more than a mere change in location; they are new approaches to birth, based on a non-violent orientation which employs natural, gentle, and supportive techniques.

Ideally, these new approaches to birthing are designed to create an environment which encourages positive emotional transactions between family and infant. In an overall climate of calm and nurturance, care is taken to maximize infant-parent contact after birth. Birth is treated as a normal physiological function rather than a pathological one and obstetric interventions - such as drugs and complicated medical procedures - are options of last resort. Every effort is made to return control over the birth process and neonatal care to the mother and family.

Often these alternatives include minimal physician intervention and emphasize instead the involvement of a nurse-midwife. Franklin (1978) notes that the nurse-midwife sees his/her role differently from the typical obstetrician and is much more inclined to offer support to the mother throughout labor, including massage and

relaxation by direct contact with patient. Additionally, the nurse-midwife is not as quick to prescribe drugs or complicated obstetrical procedures and has a high stake in "going all-out" for vaginal delivery and natural birth. While the physician is rarely available to the mother and family after birth, the nurse-midwife sees this post-natal contact as part of his/her job and continues to offer emotional support and infant care instruction after the birth.

The presence of a supportive person during labor - be it friend, husband or trained assistant - can greatly improve the mother's emotional state and her child-bearing experience. A supportive partner during labor combined with techniques learned in childbirth preparation classes can decrease the woman's need for drugs during labor and birth by improving her tolerance for pain. Klaus, Kennell and Sosa (1980) investigated the effect on mother's behavior with her infant immediately after birth of a supportive lay woman during labor. Although no differences in caretaking were noted, they did find that duration of labor was significantly less with women in the experimental groups (attended by supportive women). Their findings suggest that emotional support for mother during labor will minimize anxiety and encourage a positive birth experience.

"The presence of the prepared father during childbirth has been linked with increased feelings of paternal involvement with both mother and baby, and it can have a positive effect on how the mother perceives pain, can decrease her use of medication, and can make the birth experience much more rewarding for her." (Young, 1978:5)

Lewis Mehl in his testimony before the CCCVP (1980) advocated obstetric healthcare delivery systems which recognize the relationship between the psychological, sociological and physiological aspects of the birth experience. In addition to giving emotional support to prospective parents, the routine inclusion of a mental health professional as part of the obstetric team would assist in the identification mothers and infants at risk for subsequent problems.

Rooming in wherein mother, infant and often family members room together during hospitalization is one of the methods being tried by hospitals to approximate the home experience. Greenberg et al. (1973) conducted a randomized, controlled study to ascertain the effect(s), if any, of rooming-in on mothers of normal full term babies. They found that rooming-in did make a difference in mothers attitude toward infant and their level of confidence. These mothers also thought they would need less help at home than did the control group mothers.

Ross Parke, reporting on the results of several studies, explains that fathers who were encouraged (allowed) to take part in delivery process and to participate in active caretaking with the infant were "enthusiastic and took full advantage of the opportunity to be with their babies." (1978:211) Although some differences between mother and father in behavior toward infant have been observed (Parke, 1974, 1978; Clarke-Steward, 1978) - with mothers assuming the caretaking role and fathers taking the role of playmate most often - fathers do become involved with their infants and their involvement does make a difference.

"...the child's social and cognitive development are both affected by the degree of father involvement. At nine months, infants who have a father that has been more involved tend to deal with the stress of being separated and left alone in a empty room better than infants whose fathers show relatively little involvement in routine caretaking and play. The same holds true for cognitive development, reflected in higher Bayley scores for infants with fathers who were highly involved." (Parke, 1978:213)

Including the father as an integral part of the birth process appears to be important to the infant's subsequent development and to strengthening family bonds. If only the mother and the infant get together on an extended basis during the hospital stay, a bond may be fused which essentially excludes the father.

A study by Greenberg and Morris (1974) sought to understand the impact of the newborn on the father and the emergence of a bond between them. They determined that early contact by the father with the newborn seemed to encourage an affectionate bond. Fathers who were present at their infant's birth spontaneously commented on feelings of connectedness with their newborn whereas a non-contact father did not. Contact fathers also reported feeling more comfortable holding the infant and were sure they could distinguish their child from others.

Brazelton (1970) has observed that fathers absent from their newborns in the early months of their child's development had difficulty showing affection for their offspring. On the other hand, Greenberg's contact fathers "reported themselves to be so moved by the impact of the newborn that they (felt) drawn in toward the baby as if it were a magnet. Their attraction to the newborn is very powerful and it appears to be something over which they have no control." (Greenberg and Morris, 1974:528)

Hospital procedures which isolate the father from mother and child may be hindering an important and basic bond between them. As yet it is only in a home delivery where husband/father participation does not depend on "permission" to be with his wife, or to touch and hold their baby. There is potentially much to be gained by all concerned by allowing birth to be experienced as a significant family event.

Gentle Birth

The delivery methods advanced by F. Leboyer (1975) are directed at creating a gentle, nurturing birth experience for the infant. (The mother's relationship to her baby - early bonding - is not his primary concern.) Based on the hypothesis that birth is a traumatic, violent experience for the child, Leboyer's approach

emphasizes minimizing the "shock of the first separation experience for the neonate." (It should be mentioned that John Lind (1978) based on a study involving 130 normal full-term births, reports in contrast to Leboyer's theory, that newborn infants show little sign of anxiety of pain. Instead, says Lind, they exhibit curiosity and great expectation.)

Leboyer advocates the use of a dark, quiet room free of unnecessary sensory stimulation. He suggests placing the baby immediately on the mother's abdomen and delaying the severing of the umbilicus cord for up to 30 minutes after birth. The baby is further nurtured after birth through gentle massage and a relaxing bath in warm water - performed primarily by the attending physician.

Leboyer's claim that infants born by his method will grow up healthier and "free of conflict" is largely unsubstantiated. The Rappoport study (1976) which purports to validate Leboyer's approach used no control group for comparison and cannot be considered valid or reliable in any scientific sense.

Nevertheless, there can be little doubt that gentle birth encourages a positive experience for mother and infant and thus may do much to foster early bonding between them. It seems that an optimal birth experience would combine Leboyer's gentle attitudinal approach and calming strategies with increased parental involvement in the birth process and extended contact with the newborn.

An effort by Nelson, et al. (1980) to assess the effect of Leboyer-like birthing methods found no measurable difference "in infant behavior in the first hour of life, at 24 or 72 hours post partum, or at eight months of age; or in maternal perceptions of her infant and the experience of giving birth." (1980:655) It must be remembered, however, that failure to find "measurable effects" is often a failure of theoretical and methodological conceptualization which results

in inadequately operationalized measures. Abstract concepts like "psychological states," subjective attitudes and maternal-infant bonding are extremely difficult to measure empirically. They, nevertheless, may exert considerable influence.

Perhaps more important, the Nelson study glosses over what may be one of its most important findings: "...eight months after delivery, mothers who used the Leboyer method were more likely to say that the event had influenced their child's behavior... (and) women who expected a Leboyer delivery had shorter active labors." (1980:655) The fact that these differences may be the result of a placebo or "Hawthorne" effect does not discount the possibility that Leboyer-like birthing practices may influence in a positive sense the emotional state of the mother and/or infant and thus influence their relationship. Nelson's conclusion that Leboyer's method produces "no advantage over a gentle, conventional birth in influencing infant and maternal outcome" appears premature.

HIGH RISK BIRTH

The most significant correlation between the birth experience and subsequent violence is in the area of high-risk birth. Many clinicians and researchers have observed and documented the relationship between prematurity and severe infant illness (i.e., residence in the Intensive Care Nursery) and subsequent child abuse or neglect. (Klaus and Kennell, 1970, 1972; Klein and Stern, 1971; Lynch, 1975; Hunter et al., 1978; Roth, 1980) Typical, for instance, is Klein and Stern's finding that of 51 battered children seen over a nine year period, 23.5 percent (12) had been low birth weight (premature) infants -- a significant proportion in comparison with the 7 percent to 8 percent incidence of low birth weight generally applicable in Canada and the United States. Of the 12 abused children, 9 had been gravely ill during the neonatal period and had required extended hospital care.

Some of the correlation between prematurity, illness, and child abuse is probably due to early separation which mitigates against parents establishing a loving bond with their infant. Numerous other factors came into play with at-risk infants which may be attenuated by separation. Parental feelings stemming from acute personal crisis, including guilt, anger, and "anticipatory grief" affect their relationship with their child. (Kaplan and Stern, 1973) Called upon to change their expectations and to prepare for the possibility of loss, parents may find it extremely difficult to readjust their feelings when they are reunited with their child. Robert Roth (1980) calls this phenomenon a "mourning reaction" which if allowed to set in, makes subsequent attachment very difficult.

It is also important to point out that some of the parenting problems associated with at-risk infants may indicate parental rejection of or hostility toward the infant long before birth. In other words, mothers with severely ill or premature infants may have "encouraged" that condition by failing to take care of themselves (and thus the fetus) during pregnancy.

An important study conducted by Hunter, et al. (1978) of 255 premature infants and their families once again verified that prematurity and residence in a newborn intensive care unit are associated with child abuse. To better assess the reason for this association Hunter and associates controlled for family psychosocial characteristics (social isolation, family history of child abuse and neglect, serious marital problems, apathetic and dependent personality styles). They concluded that,

"Unique factors appear to act in combination to increase the rate of maltreatment of infants discharged from a newborn intensive care unit. This study suggests three essential components that contribute to this risk: 1) vulnerable, unsupported families, 2) biologically impaired infants, and 3) limited parent-infant contact during the nursery period." (Hunter 1978:635)

The Hunter et al. findings correspond to the clinical observations reported by Robert Roth (1980) to The California Commission on Crime Control and Violence Prevention. When discussing identification of at-risk children and parents, Roth emphasized the interrelatedness of identifying factors.

No single variable but a combination of conditions should "raise the red flag":

- 1) The age of the mother - young mothers are often ill-equipped for parenting.
- 2) Visiting patterns of parents - although many parents are limited in terms of their ability to visit, others may choose not to even though it would be relatively easy.
- 3) Verbal patterns of the mother - how does she talk to her infant; what does she say to and about her infant.
- 4) Degree of social isolation of the mother - does she have a support system of friends and family on whom she can lean (parents).
- 5) Use of drugs - hard drug usage is an indication of a particular life style and of some social isolation.
- 6) The degree of care the infant needs when it goes home versus the social resourcefulness of the mother - how adept is she at getting help?
- 7) Parenting of other children - if siblings are allowed into intensive care nursery there is an opportunity to observe sibling-parent interaction.
- 8) History of abuse or neglect on part of mother or father.
- 9) Inappropriate expectations of infant on part of parents.
- 10) Death of other children - there appears to be a relationship between inadequate parenting of newborn and the death of another child (e.g., twin deliveries where one infant dies and the other lives).

In addition to being alert to these potential warning signs, Roth suggests that Intensive Care Nursery staff can provide parental support and encourage healthy maternal-infant bonding in numerous ways:

- 1) Counsel parents of sick infants. Encourage these parents to discuss their fears and concerns.
- 2) Encourage mothers to touch and hold their babies before he/she is transported to the ICN.
- 3) Give parents realistic hope for infants recovery.
- 4) Answer parents' questions about infant death possibilities and potential brain damage. Encourage parents to ask these questions.
- 5) Encourage a bond between parents and infant even while separated:
 - a) Television monitors (such as those being developed by Mt. Zion and Bell Laboratories) for parents to view their baby from their homes;
 - b) pictures of baby or baby's footprints given to parents.
- 6) Establish parent support groups on infant care and the emotional trauma of having a child in the intensive care nursery.

[It should be noted that Siegel et al. (1980) reported that their home visit intervention program produced no statistically significant impact on incidence of child abuse and neglect in their sample population. The evidence of one study, however, is hardly sufficient to discourage further attempts at intervention.]

John Kennell (1978) describes a "small feasibility study" conducted in Cleveland which illustrates the potential benefit of allowing mothers to live-in with premature infants prior to discharge from the hospital and cites "impressive changes" in the behavior of mothers who had previously been with their infants only in the intensive care nursery. Within 24 hours of rooming-in, mothers slept better and there was marked improvement in their self-confidence and caretaking skills. For the first time they began to plan for the infants arrival at home, to push for early discharge and, in some cases, to request unlimited visiting privileges for the father. It may be that for premature and ill infants and their mothers, rooming-in may help to ameliorate bonding/attachment problems inherent in high-risk birth.

Hunter and her associates remind us that further research is needed concerning the most effective ways to reduce the risk for abuse of premature children. Their study does suggest as does Roth's testimony (1980) that:

"developing families need improved access to social supports, (that) there must be continued attention to the physical and psychosocial factors that lead to poor reproductive performance; (and further) that imaginative ways of supporting early parent-infant rapport must go beyond the current receptive stance of opening the nursery door to families." (Hunter et al., 1978:635)

It is a long way from birth to child abuse and an even longer distance from neonate experience to violent adult behavior. Variables too numerous to measure precede and follow birth and intricately influence an individual's perceptions and behavior. The lack of a direct link between violent behavior and the birth experience does not, however, negate its importance to the study of violence.

Birth is a most intimate and emotional event, a milestone in the life of a family. It is an experience which influences the subsequent relationship between parents and infant and the child's physiological, neurological, and behavioral development. Accordingly, there is reason to be careful that the birth benefits of advanced medical technology and pharmacology are not allowed to obscure their potential for harm.

There appears to be little to lose by discouraging the routine use of obstetric medication and medical interventions; encouraging nutritional and psychological health in pregnant mothers, and emotional support for them during labor; and allowing mothers more control over their own birth experience, and the care of their infant. Although research findings and scientific observations remain tentative and contradictory, common sense tells us that much can be gained by re-establishing birth as a joyous, healthy family event.

BIBLIOGRAPHY

- Ainsworth, M.D.S., "Infant Behavioral Correlates to Maternal Attachment", The Competent Infant, L.J. Stone, H.T. Smith, L.B. Murphy (eds) Basic Books, New York:1974.
- Ananth, Jambur. "Side Effects in the Neonate from Psychotropic Agents Excreted Through Breast-Feeding", American Journal of Psychiatry, 135:7, 701-805, July 1978.
- Arms, Suzanne. Testimony before the California Commission on Crime Control and Violence Prevention, San Francisco, September 1980.
- Bakwin, Harry. "Emotional Deprivation in Infants", Journal of Pediatrics; 35:512-521, 1949.
- Barnett, Cliford R., et al. "Neo-Natal Separation: The Maternal Side of Interactional Deprivation," in Pediatrics, Vol. 45, No. 2, February 1970.
- Birch, Herbert G. "The Problem of 'Brain Damage' in Children," in The Competent Infant, L.J. Stone et al. (eds.); Basic Books, New York:180-184, 1973.
- Borgstedt, A.D., Rosen M.G. "Medication During Labor Correlated with Behavior and EEG of the Newborn," American Journal of the Disabled Child, 115:21-24, January 1968.
- Bowlby, John. Attachment and Loss, Vol 1: Attachment, Basic Books, New York, 1969.
- Brazelton, T.B. "Psychophysiologic Reactions in the Neonate" Journal of Pediatrics, 58:513-518, 1961.
- , Robey, J.S. "Observations of Neonatal Behavior: the Effects of Peri-natal Variables in Particular that of Maternal Medication" Journal of Child Psychiatry, 4:613, 1965
- "Effect of Prenatal Drugs on the Behavior of the Neonate" American Journal of Psychiatry, 126:1261-1266, 1970.
- . "The Remarkable Talents of the Newborn", Birth and the Family Journal, Vol. 5:4, Winter 1978.
- , "Influence of Perinatal Drugs on the Behavior of the Neonate" in Exceptional Infant, Vol 2, Jerome Hellmuth, ed., Brunner/Mazel, New York:1971
- , Yolanda Tryphonopoulou, et. al. "A Comparative Study of the Behavior of Greek Neonates", Pediatrics, Vol. 63 #2:279-284, February 1979.
- Caldeyro-Barcia, R. et. al. "Adverse Perinatal Effects of Early Amniotomy During Labor" in Modern Perinatal Medicine, L. Gluck (ed.), Year Book Medical Publishers, Chicago 1974.
- Campbell, S.B.G., Taylor, P.M. "Bonding and Attachment: Theoretical Issues" Seminars on Perinatology, 3:3-15, 1979.
- Carlsson, S.T., Fagerberg, H., Corneman, G., Nwang, C.P., Larsson, K., Rodholm, M., Schaller, J., Danielsson, B., Gundewall, C. "Effects of Amount of Contact Between Mother and Child on the Mothers Nursing Behavior" Developmental Psychology, 11:143-150, 1970

Carlsson, S.T., Fagerbert, H., Corneman, G., Hwang, C.P., Larsson, L., Rodholm, M., Schaller, J., Danielsson, B., Gundewall, C. "Effects of Various Amounts of Contact Between Mother and Child on the Mothers Nursing Behavior: A Followup Study" Infants Behavior and Development, 2:209-214, 1979.

Claire-Stewart, Alison K. "And Daddy Makes Three: The Father's Impact on Mother and Child", Child Development, 1978, 49, p. 466-478.

Colletti, L. "Relationship Between Pregnancy and Birth Complications and the Later Development of Learning Disabilities" Journal of Learning Disabilities, 12:25-29, 1979.

DeChateau, T., Yiberg, B. "Long Term Effect on Mother Infant Behavior of Extra Contact During the First Hour Postpartum II: Followup at Three Months", Acta Paediatrica Scandinavia, 66:145-151, 1977.

----, "Long Term Effect on Mother Infant Behavior of Extra Contact During the First Hours Postpartum I: First Observations at 36 Hours" Acta Paediatrica Scandinavia, 66:137-143, 1977.

----, "Effects of Hospital Practices on Synchrony in the Development of the Infant Parent Relationship" Journal of Seminar and Perinatology, 3:45-61, 1979.

Franklin, John: "Home-like Deliveries in the Hospital", Birth and the Family Journal, Vol. 5:4, Winter 1978.

Foss, B.M., Determinants of Infant Behavior, Vol. 1, Wiley, New York:1961.

Greenberg, Martin and Morris, Morman. "Engrossment: The Newborn's Impact Upon the Father", American Journal of Orthopsychiatry, 44(4), July 1974.

----, Rosenbert, I., Lind, J., "First Mothers Rooming-In with Their Newborns: Its Impact Upon the Mother", American Journal of Orthopsychiatry, 43(5), October 1973.

Haire, Doris, "The Cultural Warping of Childbirth" Environmental Child Health, Vol. 19:171-191, June (Special Issue) 1973.

----, Testimony before California Commission and Violence Prevention, San Francisco, September 27, 1980.

----, "Efforts to Reduce Infant Mortality and to Improve the Outcome of Pregnancy", Unpublished Testimony Before Federal Committee on Labor and Human Resources, June, 1980.

Hales, D.J., Logoff, B., Sosa, R., Kennell, J.H. "The Findings of Limits of the Maternal Sensitive Period" Developmental Medicine of Child Neurology, 4:454-461, 1977.

Harlow, H.F. and M.K. Harlow. "The Affectional Systems," in Behavior of Nonhuman Primates, Vol. 2, A.M. Schrier, H.F. Harlow, and F. Stollnitz, eds.: Academic Press, New York: 1965.

Harlow, H.F. and Clara Means. The Human Model: Primate Perspectives, Winston & Sons, Washington, D.C.: 1979.

Hellmuth, Jerome (Ed.) Exceptional Infant: Studies in Abnormalities, Vol 2, Brunner/Mazel, New York: 1971.

Hunter, R.S., Kilstrom, N. et. al., "Antecedents of Child Abuse and Neglect in Premature Infants: A Prospective Study in a Newborn Intensive Care Unit," Pediatrics, 61:629, 1978.

Hurley, L.S. "Maternal Zinc and Manganese Deficiency and Fetus Development." Symposium on Fetal Malnutrition, Foundation March of Dimes, New York: January 28, 1970.

Kennell, J.H., Jerauld, R., Wolfe, H., Chester, D., Kreger, N.C., McAlpine, W., Steffa, M., Klaus, M.H. "Maternal Behavior One Year After Early and Extended Postpartum Contact" Developmental Medicine and Child Neurology, 16:172-179, 1974.

Kennell, John H. "Parenting in the Intensive Care Unit". Birth and the Family Journal Vol. 5:4, Winter 1978.

Klaus, Marshall H. "The Biology of Parent-to-Infant Attachment". Birth and the Family Journal, Vol. 5:4, Winter 1978.

----, et al. "Does Human Behavior After Delivery Show a Characteristic Pattern?" in Parent-Infant Interaction, Elsevier, Amsterdam: 1975.

----, Kennell, J. Maternal Infant Bonding, Mosby, St. Louis, 1976.

----, Kennell, John. "Mothers Separated from Their Newborn Infants," in Pediatric Clinics of North America, Vol. 17, No. 4, November 1970, pp 69-85.

----, Kreger, N., McAlpine, W., Steffa, M., Kennell, J. "Maternal Attachment: Importance of the First Postpartum Days", New England Journal of Medicine, 286: 460-463, 1972.

Klein, M., and L. Stern, "Low Birth Weight and the Battered Child Syndrome" American Journal of Medicine, 286: 460-463, 1971.

Koel, B.S., "Failure to Thrive and Fetal Injury as a Continuum," American Journal Dis Child, 118:565, 1969.

Kron, R.E. et. al., "Newborn Sucking Behavior Affected by Obstetric Sedation" Pediatrics, 37:1012, 1966.

Leiderman, P. Herbert, et. al., "Some Determinants of Maternal Attachments," Unpublished paper presented to 130th Annual Meeting of the American Psychiatric Association, 1977.

----, "Human Mother to Infant Social Bonding: Is There a Sensitive Phase?" in Ethology and Child Development, K. Immelmann and G. Barlow, eds.; Cambridge University Press, in press.

Leonard, Carol, Testimony before the California Commission on Crime Control and Violence Prevention, San Francisco, September 1980.

Levine, Peter. "Intra-Uterine Environment, Stress and Neurological Development," unpublished paper, 1978.

Leboyer, Frederick. Birth Without Violence, Alfred A. Knopf, New York: 1975.

Lind, John, "The Family in the Swedish Birth Room", Birth and the Family Journal, Vol 5:4, Winter 1978.

Lynch, M.A. "Ill Health and Child Abuse," Lancet, 2:317, 1975

Mehl, Lewis, Testimony before the California Commission on Crime Control and Violence Prevention, San Francisco, September 1980.

Money, J., Ehrhardt, A.A., and Masica, D. "Fetal Feminization Enduced by Androgen Insensitivity in the Testicular Feminizing Syndrome - its Effect on Marriage and Maternalism" John Hopkins Medical Journal, 123:105-114, 1968.

Montagu, M.F., Ashley, Life Before Birth, New American Library, New York: 1964.

Moya, F., Thorndike, V. Clinical Pharmacological Therapy, 5:628, 1963.

Murray, Charles A., The Link Between Learning Disabilities and Juvenile Delinquency April 1976, Law Enforcement Assistance Administration, Department of Justice, Washington, D.C.

Nelson, Nancy, Enkin, M. et al., "A Randomized Clinical Trial of the Leboyer Approach of Childbirth." New England Journal of Medicine, March 20, 1980, pp. 655-659.

O'Connor, S., Vietze, P.M., Sherrod, K.B., Sandler, H.M., Altemeir, W.A. "Reduced Incidence of Parenting Inadequacy Following Rooming-in" Pediatrics, 66:176-182, 1980.

----, Testimony before the California Commission on Crime Control and Violence Prevention, San Francisco, September 1980.

Parke, R.D., O'Leary, S.E. and West, S. "Mother-Father-Newborn Interaction in the Newborn Period," K. Riegel, J. Meacham (eds.) Determinants of Behavioral Development II, New York: Harper and Row, 1974.

----, "A Fathers Role in Infancy: A Re-evaluation." Birth and the Family Journal, Vol. 5:4, Winter 1978.

Public Health Service, Food and Drug Administration, General Considerations for the Clinical Evaluation of Drugs in Infants and Children, 1972.

Rappoport, Danielle. "Pour une Naissance Sans Violence," Bulletin de Psychologie 29 (1975-76), pp 552-560.

Rheingold, Harriet L. (ed.), Maternal Behavior in Mammals, Wiley, New York: 1963.

Ringler, N.M., Kennell, J.J., Jarvella, R., Navojosky, B.J., Klaus, M.H., "Mother to Child Speech at Two Years: Effects of Early Postnatal Contact" Journal of Pediatrics, 86: 141, 1975.

Satterfield, James H. "The Hyperactive Child Syndrome: A Precursor of Adult Psychopathy?" in Psychopathic Behavior, Approaches to Research, R. Hare and D. Schelling (eds.) Chichester: Wiley, 1978.

----, et al., "Multimodality Treatment," Archives of General Psychiatry, Vol. 36, August 1979.

Schaffer, H.R. (Ed.) Studies in Mother-Infant Interaction, Academic Press, New York: 1977.

Shearer, Madeline H., Testimony before the California Commission on Crime Control and Violence Prevention, San Francisco, September 1980.

Siegel, E., Bauman, K.E., Schaefer, E.S., Saunders, M.M., Ingram, D.D. "Hospital and Home Support During Infancy: Impact on Maternal Attachment, Child Abuse and Neglect and Health Care Utilization" Pediatrics, 66:183-190, 1980.

Silver, A., and Hagin R. "A Search Battery for Scanning Kindergarten Children for Potential Learning Disability," Journal of American Academy of Child Psychiatry, 15, 1976.

Smith, D.W. "The Fetal Alcohol Syndrome," Hospital Practice; 121-128, October 1979.

Sontag, L.W., Wallace R.D. "Changes in the Rate of the Human Foetal Heartbeat in Response to Vibratory Stimuli" American Journal of the Diseases of Childhood 51, 583-589, 1941.

Sosa, R., Kennell, J., Klaus, M., Urrutia, J. "The Effect of a Supportive Woman on Mothering Behavior and the Duration and Complications of Labor," Pediatrics, August 1980.

Stern, Leo, "Prematurity as a Factor in Child Abuse", Hospital Practice, May 1973.

Stone, L.J., Smith, H.T., Murphy, L.B. (eds) The Competent Infant, Basic Books, New York: 1973.

Streissgoth, A.P., Herman, C.S., Smith, D.W. "Intelligence, Behavior, and Dysmorphogenesis in the Fetal Alcohol Syndrome," Pediatrics, 92, 3:363-367, 1978.

Ucko, L.E., "A Comparative Study of Asphyxiated and Non-Asphyxiated Boys from Birth to Five Years," The Competent Infant, L.J. Stone et al. (eds), Basic Books, New York: 1973.

Young, Diony, "Bonding: How Parents Become Attached to Their Baby," International Childbirth Education Association, 1978.

Young, R.D. "Effects of Differential Early Experiences and Neonatal Tranquilization on Later Behavior," Psychological Reports, 17:675-680, 1965.

Zamenhoff, S., Van Marthens, E., and Margolis, F.L. "DNA and Protein in Neonatal Brain," Science, 160:322, 1968.

Biochemical Influences on Violent Behavior*

Partly as a result of the limited success of traditional psychosocial approaches and partly because of an increasing level of sophistication in the areas of nutrition, clinical ecology and behavioral toxicology, a good deal of attention has been directed in recent years to the influence of various chemicals on the brain and thus on behavior.

It now appears that the ecologic-biochemical approach to the prevention and treatment of violent or antisocial behavior may have much to offer. The ecologic component is concerned with the ways in which the human being in interaction with the external physical environment may develop maladaptive patterns that affect his/her health. (Osmond, 1967; Hoffer, 1973/78; Hippchen, 1978) This approach rests on the theory that human beings have evolutionarily adapted to an environment which has changed considerably. As industrial society progresses humans are increasingly subjected to "unnatural" substances such as chemical toxins, drugs, food additives, and environmental contaminants to which they may not be evolutionarily adapted and which, thus, may adversely affect their behavior.

The biochemical area looks at the ways in which the brain may be affected by the molecular concentration of many substances that are normally present in the brain. Human beings are to some degree biochemically unique. An optimal concentration of these substances for one person may be insufficient for another. Deficiencies or excesses in chemical concentrations may adversely affect the brain and thus behavior. Chemical imbalances, it is theorized, can have genetic origins or stem from improper nutrition on the part of mother and/or child. (Hippchen, 1978)

*This literature review (1/15/81) should be considered a preliminary draft since it has not been reviewed by Commissioners or expert witnesses.

In other words, chemical imbalance or malnutrition may stem from internal or external factors. (Jani and Jani, 1974-75) External contributing factors include: 1) lack of knowledge of good food habits, 2) lack of understanding or concern about the quality of food intake (e.g. overingestion of calories, low nutrient foods), 3) lack of proper or adequate food due to poverty or the unavailability of food-stuffs.

Internal factors can be due to genetic defects in metabolic processes. The condition called Phenylketonuria (PKU) is an example of this type of defect. In the case of PKU, which if left untreated can lead to severe mental retardation, a missing enzyme results in an accumulation of toxic byproducts in the blood, cerebrospinal fluid and urine. Genetic vitamin dependencies, whereby an individual requires extra-ordinary intake of certain vitamins, can result in an inability to function normally. Some individuals, as the result of disease or genetic make-up are unable to absorb the nutrients from food intake even though their diet is adequate. Physiological stress due to physical or emotional illness may alter the body's need for proteins, vitamins, and minerals.

Chemical contributors to aberrant behavior fall into two major categories:

"a) disorders of nutrition due to a need for certain vitamins, due to a need for some essential trace minerals and b) idiosyncratic or allergic reactions to foods and other chemicals found in our environment." (Hoffer, 1979:171)

Chemicals ingested into the body affect behavior because of their impact on the brain. The human brain has often been likened to a computer. There is merit in that analogy, but there are also some critically important differences. For one, the brain consists primarily of water--about 85 percent by weight. Connections are made by liquids dissolved in a liquid medium, rather than with the firmly wired metallic contacts and conductors one finds in a commercially produced computer. Obviously, the functioning of the "soggy computer" depends to an enormous

degree on the substances dissolved in the liquid. Even minute amounts of LSD, PCP, or lead can lead to severe disruption. Greater amounts of alcohol can also interfere. Shortages of substances required by the brain can also cause problems. (Rimland, 1980) A multitude of substances are absolutely required if the brain is to function, including vitamins and minerals. In some instances the human brain can be allergic to certain substances commonly found in the environment, and allergic reactions of the brain can be manifested in aberrant behavior.

The "soggy computer" concept of the brain has important implications for remediation. Certain methods exist, and others are under development, that have been found to improve or restore cognition in humans. These methods, known collectively as orthomolecular therapy, entail changing the composition of the fluid by reducing the level of noxious substances and/or increasing the concentration of substances the brain requires.

According to A. Hoffer (1973, 1979) adverse chemical effects on the brain can lead to aberrant behavior because of perceptual changes. Also known as metabolic dysperception or the dyslogic syndrome (Wacker, 1975), perceptual distortions can result in learning disabilities and in behavior, which although labeled criminal or anti-social, appears to one thus afflicted to be entirely appropriate. Although the nature of the relationship is not clear, learning disabilities and hyperkinesis are known to be associated with delinquency and adult criminality. (Murray, 1976; Lane, 1980) This review is therefore concerned with the effect of diet and environmental contaminants on aberrant or violent behavior directly, and indirectly as a factor in learning dysfunction and hyperactivity.

NUTRITIONAL FACTORS

That we are, to a certain degree, what we eat should come as little surprise to anyone. With the 20th century rise of scientific nutrition, the relationship between diet and health has become an accepted one. Food is a chemical entity, capable of affecting the brain and thus behavior in the same way as alcohol and other drugs.

Hypoglycemia

Hypoglycemia means "low blood sugar," but the mental problems which are attributed to hypoglycemia appear to be the result of abnormal fluctuations in the blood sugar level. Such fluctuations are brought about largely by the excessive consumption of sugar containing foods, to which the human body has difficulty in adjusting. Evolution produced a brain which utilizes glucose (blood sugar) for energy. Table sugar (sucrose) has been available in quantity only in recent years. Eating large amounts of sucrose triggers an intricate process in the body metabolism which results, in some cases, in a severe disruption of the brain's glucose metabolism. The quick energy sucrose supplies may in the long run be expensive to one's emotional as well as physical health. Self-reported hypoglycemic symptoms range from difficulty with concentration, underachievement in school, sexual dysfunction and depression to paranoia, anxiety, and easily triggered violent reaction (Reed, 1977).

Many specialists in the nutrition-behavior area regard sugar as the arch villain in producing an increase in juvenile crime and disruption and in causing degradation of learning skills. Sugar consumption has risen rapidly during recent years, the current per capita consumption being about 130 pounds per year, which averages about 6 ounces per day. As with other additives, however, some individuals consume

many times that amount.

Alexander Schauss' preliminary survey of the dietary habits of a limited sample of delinquents revealed that "reported daily sucrose consumption of 12.02 ozs. (350 g.) per interviewee. If this daily consumption were kept constant, each delinquent would have consumed at least 274 pounds of sucrose a year! This quantity is more than double the estimated average disappearance consumption of sucrose for the United States population." (Schauss, 1979:Part 1,pg.150)

Although a vast amount of literature exists on the adverse psychological effects of excessive sugar (e.g., Rodale, 1968; Yudkin, 1972; Dufty, 1975; Wallace & Wallace, 1978), most of the evidence is anecdotal or circumstantial. Few controlled studies have been done, because it is hard to control diets (especially of those who crave sweets), because foods that contain sugar also contain fats and additives, and for various other reasons.

Barbara Reed, a municipal court probation officer of Cuyahoga Falls, Ohio reports considerable success in reducing violent tendencies among probationers diagnosed as hypoglycemic. In her testimony before the Senate Select Committee on Nutrition and Human Needs (1977) Reed stated that of the 258 persons referred to her probation department during 1975 and 1976 who were tested, 82 percent evidenced symptoms of hypoglycemia. Citing primarily anecdotal data, Reed states that utilizing traditional counseling and a diet designed to treat hypoglycemia--one which is sugar free, high in protein and low in starch--resulted in dramatic and swift personality change. "No one," stated Reed, "who has maintained the good nutritional diet has been back in Court." (1977, p.63)

One possible explanation for Reed's reported successes is the placebo effect--change in probationer behavior may be due to a component of therapy unrelated to diet.

During the 1977 U. S. Senate hearings on nutrition, Senator Dole questioned Ms. Reed about this possibility:

Senator Dole: I wonder how many of these success stories are because of diet and how many are because they may have been receiving special attention, someone cared about their rehabilitation?

Mrs. Reed: I'm convinced that these people get better because of the diet. ...I'm convinced that (as their health improves) all these fears of people, the dark pits they are in, all this disappears. I really, of course, do an awfully lot of talking and listening.

"When they first come to the office and they are ill, they don't remember a thing you are saying. It makes no difference what you say to them as long as they are ill. They must get healthy first.

....I've been in this field for 14 years. I was giving people a lot of loving attention before without nearly the results as now. The two work hand in hand." (pg. 57-59)

To adequately interpret Reed's reported success with diet therapy, longitudinal data must be collected on the recidivism rates of those treated. Alexander Schauss reported in his testimony before the California Commission on Crime Control and Violence Prevention (December 1980) that Reed has maintained an 8½ percent recidivism rate for 1,000 offenders she has treated over a five year period. These data to the best of this writer's knowledge have not been published or subjected to rigorous scrutiny. Sophisticated statistical analysis remains to be done to assess the influence of the multitude of other variables, psychological and environmental including those related to placebo effect, which might account for the reported behavioral changes. Reed's case studies are certainly impressive enough, however, to warrant further attention to the possibility of a relationship between hypoglycemia and aggressive behavior.

Anthropologist Ralph Bolton (1973, 1974, 1975, 1976), in an investigation of the Qolla Indians of Peru, tested the hypothesis that moderate hypoglycemia tends to produce high levels of individual aggressiveness. Bolton found Qolla culture to be one of considerable conflict and violence with high rates of petty insults,

theft and homicide. A four-hour glucose tolerance test administered to a sample of 54 adult males determined that almost 60 percent of them were hypoglycemic. Bolton found a statistically significant correlation (0.3) between very aggressive behavior and moderate levels of hypoglycemia. Although this correlation accounts for under 10 percent of the variance in aggression it may, indirectly, account for a much larger share.

"The very high aggressors were almost to a man moderately hypoglycemic and it is the behavior of these men that determines the high levels of aggression in the village as a whole, since other villagers must to some extent behave aggressively out of self-defense. In other words, a conflict magnification process is operating. Conflict, once started, may be self-perpetuating, particularly in small-scale, face-to-face societies, and if one has a persistent source of "push" from the biological condition of a substantial portion of the population, then the effect is likely to be dramatic." (Bolton, 1976:261)

Bolton does not posit a direct cause and effect relationship between hypoglycemia and aggression in Qolla society, nor does he suggest that the direction of the relationship is clear. The Qolla live under stressful socioeconomic conditions including overpopulation, poor economic resources, inadequate food supply, protein deficient diets, high levels of alcohol consumption, and a high level of conflict. It may be that these stressful conditions help to create the hypoglycemic condition. On the other hand, hypoglycemic biological tendencies may encourage an aggressive reaction to these stressful conditions among hypoglycemic individuals.

Social, cultural and psychological factors must be fully addressed before a full understanding of Qolla culture is possible and before Bolton's hypothesis about the relation between hypoglycemia and aggression can be considered adequately tested.

Hypoglycemia may encourage aggressive behavior in combination with other biologic disorders. For instance, Robert Buckley (1979) and Yaryvra--Gobias (1974) suggest that temporal lobe dysrhythmia, possibly caused by anoxic damage which occurs during compression of the skull when labor is prolonged, may interact with hypoglycemia to

"cause the person to become prone to aggressive temper tantrum behavior as the result of rather minor stimuli." (Buckley, 1979, p. 188)

Food Additives

Benjamin Feingold (1973, 1976), posits that hyperkinesis and learning dysfunction can be eliminated in 30 percent of the children thus afflicted by removing synthetic colors and flavors and "natural salicylates" (aspirin-like substances) from their diet.

Further exploration of this hypothesis is important for two reasons. First, experimental investigation of its validity will do much to clarify the relationship between food and behavior for general application. Second, if found to be useful when applied to hyperactive children it could, given the association between H-ID and adult criminality, be an important preventative tool.

According to Feingold he has concentrated on synthetic colors and flavors because they are the most common food additives (more than 3,000 chemicals are currently used by the food industry to solve problems such as spoilage, flavoring, texturizing, etc.), and are thus the most common cause of adverse reactions. Other classes of additives may also be detrimental since "no chemical is exempt" and "any compound in existence, whether natural or synthetic, may induce an adverse reaction if its consumer has the appropriate genetic profile, i.e., predisposition." (Feingold:1976)

Feingold's assertions about the possible relationship between food additives and hyperkinesis derive from clinical observations not controlled experiments. For this reason they have been discounted by much of the scientific community. Numerous

researchers have, however sought to test his hypothesis scientifically using controlled double-blind, and in some cases, cross-over designs.

Although earlier studies (Harley, 1978; Mattes, 1978) report the effect of diet on behavior as insignificant, other more recent works find some evidence that artificial colors aggravate hyperkinetic symptoms. Bernard Weiss and associates (1979) found that, while 20 of the 22 children studies (none of whom were diagnosed as hyperkinetic) evidenced no sensitivity to artificial color challenge, two reacted significantly.

Weiss et al. conclude that their data "further strengthen the accumulating evidence from controlled trials, supplemented by laboratory experiments, that modest doses of synthetic colors, and perhaps other agents excluded by elimination diets, can provoke disturbed behavior in children." (Weiss et al., 1980:1488). As Weiss notes, he and most other investigators have employed additive doses (26mg.) far less (up to 50 times less) than the maximum allowable daily intakes recommended by the Food and Drug Administration and potentially far less than the amount consumed daily by many children.

By raising the doses to 100 or 150 milligrams Swanson and Kinsbourne (1979) found that 17 of the 20 hyperactive children in their sample exhibited impaired learning performance on the day they ingested food dyes. The nonhyperactive group, on the other hand, did not react to the food dye challenge. Consistent with Feingold's hypothesis, the Swanson and Kinsbourne study suggests that while food additives such as artificial dyes and flavors do not cause hyperactivity in all children, they may aggravate a pre-existing hyperactive condition or call it forth in those thus biologically predisposed.

The National Advisory Committee on Hyperkinesis and Food Additives in its final report to the Nutrition Foundation* (October, 1980) invokes the placebo effect in an effort to explain Feingold's reported successes with hyperactive children.

"The components of therapy that are without specific activity for hyperactivity and learning disability would be changes in attitude about the condition, the expectation that special diets will improve the disorder and the belief that certain components of food are toxic. The Feingold regimen possesses several, non-specific treatment characteristics that would be expected to produce a powerful placebo response. First, the dietary change, while removing specific additives, also drastically alters shopping and cooking routines, and produces big changes in eating habits. Since most preprocessed foods are eliminated, the family must prepare foods from scratch. While shopping, labels must be repeatedly checked. Most favorite snack foods are eliminated, and such habits as gum chewing and the use of mints or hard candy must be discontinued. All of these changes drastically alter routines and the family must continually think about their dietary choices. These changes would be expected to increase, and alter the focus of, attention paid to the child with behavior problems. Prior to dietary treatment, these children often receive considerable negative attention. The focus on foods, rather than on the child, as the source of an unpleasant emotional atmosphere, can be expected to dramatically alter the emotional dynamics within a family. Secondly, the Feingold diet eliminates substances that many people assume to be toxic, whether or not there is scientific evidence for this conclusion...

The belief that food additives are toxic would be expected to produce changes in behavior based upon the expectation that behavioral deterioration will result from their ingestion...finally, the conditions of hyperactivity and learning disability possess characteristics that lend themselves to placebo effects in treatment. Both are disorders characterized primarily by behavioral symptoms that provoke considerable guilt on the part of parents since these behaviors are often interpreted as signs of poor parenting. In this atmosphere of guilt there is an emotional need to perceive the disorder as caused by sources outside the home and family. These needs can be expected to increase the potency of placebo effects based upon the belief that foods rather than family interaction are producing the child's problem." (1980:32)

After criticizing the serious methodological flaws inherent in the studies completed thus far (Weiss et al., 1980; Mattes, 1978; Williams et al., 1978; Levy et al., 1978; Levitan et al., 1977; Mailman et al., 1980; Harley et al., 1978; Connors et al., 1976), and acknowledging the extremely difficult nature of scientifically investigating the relationship between chemical ingestion and

*The Nutrition Foundation was created and is financially supported by the food industry.

behavior, the authors of the report find the behavioral changes noted in the cited studies to be too insignificant quantitatively to warrant further investigation.

They conclude:

"...the studies already completed provide sufficient evidence to refute the claim that artificial food colorings, artificial flavorings, and salicylates produce hyperactivity and/or learning disability. We see no indication based on this evidence for the continuation of high priority, specially funded programs for further investigation in this area." (1980:33)

The placebo effect may indeed explain some of Feingold's ability to diminish hyperkinesis through diet. It does not, however, explain the negative effect of artificial color on behavior evidenced in the double-blind cross-over studies of Weiss et al. and by Swanson and Kinsbourne. The Swanson and Kinsbourne study is especially important because unlike the studies of Harley, Weiss and others, it used hyperactive children as its experimental group and challenged its subjects with larger, possibly more realistic, doses of dye. The definitive study has yet to be done. It would seem, as suggested in the written summaries of most of the researchers who have contributed to the accumulating body of knowledge in this area, that it is too soon to draw firm conclusions or discourage further research.

Vitamin-Mineral Deficiencies/Dependencies

According to Linus Pauling (1968) optimal levels of nutrients (vitamins and minerals) are needed for brain growth and functioning. Although these optimal levels differ according to the individual, most people have the same general genetic requirements for adequate nutrition. If food which supplies these nutrients is not consumed, a vitamin deficiency may result. A certain segment of the population has a genetic need for certain vitamins and minerals far in excess of "normal" requirements. For these people, a normal, well-balanced diet may not provide nutrition adequate to their needs. These individuals are said to suffer from vitamin dependency.

Symptoms evidenced by persons suffering from vitamin or mineral deficiencies or dependencies can be those of physiological, emotional, or cognitive dysfunction and according to Linus Pauling and others (Kubala et al., 1960; Osmond, 1967, Rimland, 1973, 1978; Hoffer, 1973, 1979; Kolata, 1976; Lesser, 1977, 1980; Kershner et al., 1979) can be treated orthomolecularly through megavitamin therapy. The term "orthomolecular" was coined by Pauling in 1968. (Ortho means "correct" or "corrective.") According to Pauling "orthomolecular psychiatric therapy is the treatment of mental disease by the provision of the optimum molecular environment for the mind, especially the optimum concentrations of substances normally present in the human body." (1968:265) Orthomolecular therapists ordinarily work with nutrients, and only rarely with drugs, which are foreign to the body and therefore are more likely to be toxic.

This review is interested primarily in the potential relationship between nutrient deficiencies and mental illness, hyperactivity and learning dysfunction. Although the efficacy of megavitamin therapy for behavioral problems remains controversial, research data are accumulating (for a recent review, see Kahan, 1980) that appear to support its use along with other traditional therapies.

Until recently, most of the reports on the use of megavitamin therapy as a means of treating learning and behavior disorders have been anecdotal. In the past 2 years, however, a series of papers have been published, employing double-blind crossover designs and sophisticated laboratory tests of blood, urine, and EEGs, that indicate that high dosage levels of certain of the B vitamins (particularly B-6) may confer benefits on some youngsters with disordered behavior (e.g., Lelord et al., 1978, 1979; Rimland et al., 1978; Coleman et al., 1979). Most of these studies deal with youngsters with problems, such as mental retardation, autism, or clinical hyperactivity. Nevertheless, their positive findings have implications for the value of the approach in other populations.

Not all of the recent studies have provided positive results. For example, Arnold et. al., (1978) reported that megavitamins had not alleviated hyperactivity in their sample of school children. The treatment, however, had been used for only 2 weeks--perhaps too short a time for a meaningful evaluation.

Michael Lesser, a clinical psychiatrist from Berkeley, California, cited the following example from Hoffer (1973) of mental illness due to nutritional imbalance.

"Less than forty years ago, upwards of 10 percent of the population of some Southern mental hospitals were suffering from pellagra, a B-vitamin deficiency disease, caused by eating a high-corn, low-protein diet, inadequate in niacin. Until it was discovered that these persons were suffering from malnutrition, they were considered schizophrenic. When they were placed on a corrective diet their sanity returned. Today we know that "mental" illness can result not only from deficiencies of niacin, but also from deficiencies of thiamine (B-1), ascorbic acid (vitamin C), pyroxidine (B-6), cyanocobalamin (B-12), folic acid, biotin (H), deficiencies of certain amino acids and minerals, as well as from inadequate blood sugar." (1977:21)

According to Lesser (1977, 1980) and other orthomolecular therapists, nutrition therapy has many benefits for schizophrenics and others who suffer from severe perceptual distortions which are traditionally treated (sedated) primarily with drugs. Testifying before the U.S. Senate Select Committee on Nutrition and Human Needs as to the success of his megavitamin, orthomolecular approach, Lesser stated:

"Over the past six years, I have treated over 500 cases of schizophrenia, gradually becoming more sophisticated in by biochemical workup and therapy... Today I can state, without reservation, that orthomolecular psychiatry is definitely helpful in the treatment of the schizophrenias. While I am not claiming a complete cure, in about 85 percent of my patients I found it significantly improved their condition." (1977:23)

Nutrition therapy is safer and more acceptable to these patients than drugs because it utilizes substances (nutrients) which are normal constituents of the body. Tranquilizers and other drugs as therapeutic modalities may inadvertently instigate a "revolving door" syndrome whereby the patient, because of the unpleasant side effect of drugs, may discontinue their use upon leaving the hospital. Additionally,

nutrients are a much less costly form of treatment since unlike drugs they are plentiful in nature. Possibly the most important aspect of orthomolecular therapy is its potential for treating the cause of illness. Drugs do not cure schizophrenia; they temporarily control it by putting the patient into a "chemical straitjacket".

As mentioned previously, orthomolecular therapy is still a highly controversial treatment modality. Much of the medical community remains skeptical, and rightly so since research findings are contradictory. The positive data provided by its advocates, however, give cause to take the megavitamin approach to behavioral disorders seriously. When applied in combination with other approaches, its potential for intervention and prevention appears promising.

"Junk Food" Diets

Lonsdale and Shamberger (1980) in their study of teenage diets found that the "junk food" intake of American youth can result in a paradoxical condition of over consumption and undernourishment. Although their caloric intake was high many of the teenage subjects existed on diets which were nutrient deficient. In a few cases the deficiency was so severe that it resulted in beriberi--extreme thiamine deficiency. Among the symptoms exhibited by those with beriberi were personality changes such as increased irritability, aggressiveness and poor impulse control. After treatment with massive doses of thiamin the beriberi condition disappeared and with it the disturbing personality characteristics.

Liggio (1969) studied a group of children in Italy whose diets completely lacked animal protein, consisting, instead, primarily of bread, potatoes, and pasta. As a result, the children were restless, impulsive, inattentive, and had poor memories. In cases where the child was provided with the recommended 100 grams of meat daily, behavior improved considerably.

Another interesting report of the effect of improved diet upon behavior, this one involving naval personnel confined in the Naval Correctional Center in Seattle, was provided by Baker (1979) and discussed by Schauss (1980):

"On 1 November 1978, white flour was removed from the confinees' diet and was replaced with whole wheat bread. On 3 February 1979, granulated sugar was removed from the confinees' diet. This consisted of removal of all pastries, cakes, ice cream, soft drinks, and Kool-Aid from the confinees' diet. The confinees are allowed a teaspoon of sugar in their coffee (or tea) and drink milk or water.... Since this time, the medical log shows that a definite decrease in the number of confinees at sick call and on medication has occurred, and that disciplinary reports from the period this year are down 12 percent from the same time-frame last year." (Quoted in Schauss, 1980:6)

Schauss, Bland and Simonsen (1979) evaluated the diets of two juvenile groups: 22 chronic offenders and 22 others matched for demographic characteristics, and selected from a population of moderately to severely behaviorally disordered students. The diet data collected revealed that the delinquent group consumed "20 to 25 percent fewer micro-nutrients per 1000 calories than the control group, strongly indicating the need for examining the potential malnutrition of over-consumption and under-nutrition of the delinquent group as it relates to their inability to effectively process calorie intake." (Schauss, 1979:222)

As Schauss cautions, these data do not indicate that dietary differences account for differences in behavioral problems. Offender diets may indicate pre-existing compulsive behavior patterns which contribute to a "nutritionally induced chemical exacerbation of a pre-disposition to anti-social behavior." (Schauss, 1979:222)

The one factor found to be most statistically different between the two groups, was their milk consumption. Since allergic reaction to milk has been implicated in exacerbating the symptoms of hyperactive children (Rapp:1979), further investigation of the effects of overconsumption of milk and the possible connection of

same with delinquency, may be advisable.

It should be noted that both sugar and white flour contain very little nourishment other than calories. The process of refining wheat to make white flour from the whole wheat removes 87 percent of the fiber, 98 percent of vitamin B-6, 84 percent of the magnesium, 81 percent of the manganese, etc. The brain, which must have these nutrients in order to function properly, evolved over a period of hundreds of thousands of years during which vitamins and minerals were not removed from foods through a "refining process." (Rimland, 1980) Thus, it may not be surprising that some individuals who consume highly refined foods such as white sugar and white flour may suffer problems in learning and behavior.

Cerebral Allergies and Chemical Intolerances and Addictions

Cerebral allergy can be defined as an unusual or excessive reaction of the brain to a foreign substance (Amos, 1976; Wunderlich, 1978). Cerebral allergies appear to be a response to a wide variety of common substances. Among these are food (most commonly, refined sugar, milk, wheat, corn, chocolate, citrus, and eggs), artificial food flavors and colors, dust, pollen, metals, pesticides, smog and synthetic materials like plastic (Wunderlich, 1978; Saifer, 1980; Schauss, 1980; Rees, 1980).

In testimony presented to The California Commission on Crime Control and Violence Prevention (December 4, 1980) Phyllis Saifer, a Clinical Ecologist practicing in Berkeley, California, described this phenomenon:

"When we eat, breathe, and drink something to which we're allergic, chemicals are released in the bloodstream which travel throughout the body to different target organs. We are all familiar with wheezing, which is the allergic reaction of the lungs; with sneezing, which is an allergic reaction of the nose; and with itching which is the allergic reaction of the skin...the least familiar form of allergy has been cerebral allergy which is when the brain is the target organ...the brain, of course, can't breathe or sneeze or itch, however it can and does react, often violently." (1980:118-119)

Since the brain controls perception and behavior, brain allergies can result in a wide spectrum of mal-adaptive and aberrant reactions. Most commonly manifested by fatigue and headaches, brain allergy can also contribute to confusion, anxiety, seizures, learning dysfunction, hyperactivity, extreme irritability, hostility and even violent behavior (Philpott, 1980; Saifer, 1980; Wunderlich, 1978; Mackarness, 1976, 1980; Feingold, 1975).

The more a person comes into contact with or ingests a substance, the greater the likelihood that substance will become the source of an allergy provided a person is biologically predisposed to allergic reaction in general (Saifer, 1980, Wunderlich, 1976, 1978; Rees, 1978, 1980; Philpott, 1976, 1978). Ironically, a person who is severely reactive to a particular food often becomes addicted to it. Eating the food relieves the craving temporarily and a cycle of "eat-hurt-eat-relieve," not unlike that which occurs with drug and alcohol addiction, can become a way of life (Wunderlich, 1978).

One who is neurologically allergic may have extreme difficulty interacting appropriately with others. An intricate pattern of social mal-adjustment and psychological ill-health may develop, and reinforced by negative reactions from others lead to increased aberrant behavior. The following excerpt from Wunderlich (1978) describes the interactive, cumulative nature of this problem:

"A mother who is unduly fatigued and irritable because of excessive sugar in the diet will not be the kind of parent who can flexibly respond to the demands of child rearing. A parent who is lethargic and depressed because of a maladaptive reaction to cow's milk will not be likely to radiate enthusiasm and love with his child. The teacher who is not thinking clearly owing to wheat in the diet will not be able to organize the classroom, meet the needs of vulnerable children, and manage wiggly kids with calm.

The father who is sleepier than he should be because of the mental torpor associated with allergy will not be available to share precious moments with his child. Baseball, walks, and man-talk just don't make

it into his day. Furthermore, the man of the house who is ill has difficulty supporting and satisfying his wife. Most of his energy goes into the work day. Home is for his recovery.

For the neuroallergic adult it is easier to let a child stay the way he is and to let him have his way, than to invest time and energy in the difficult project of objectively meeting his needs and providing guidance. Communication often suffers in the home of the neuroallergic. When one is biologically ill, he is not adept at managing the tricky business of child rearing, and he is not very skillful at successful citizen making.

The sibling who is hyperaggressive and violent because of milk allergy makes home a living hell. Chaos reigns. Survival and beat-a-retreat displace cooperation in such a home. The teenager with a social behavior due to corn in the diet can disrupt the best of families." (1978:241)

No definitive data exist connecting brain allergy with criminal behavior. Anecdotal evidence abounds, however, as reported by the clinicians cited in the foregoing pages. Their reports point strongly to the possibility of such a connection in some cases. Further, they suggest the advisability of submitting violent criminal offenders to a thorough medical and bio-chemical examination for data collection and treatment purposes.

ENVIRONMENTAL CONTAMINANTS

Toxic Metals

The most common toxic metals are lead, mercury, cadmium, and aluminum. Concentrated and prolonged exposure to them can produce a variety of psychological and physiological symptoms including nausea, fatigue, depression, irritability, confusion, hyperactivity, learning dysfunction and other behavioral problems in children (Gordon, 1974; Schaul, 1980; Rees, 1980; David, 1972; Bryce-Smith, 1971, 1974; Gordus et al., 1973; Pfeiffer, 1973; Schroeder, 1973).

Of all the environmental pollutants that adversely affect intelligence and behavior, lead is perhaps the most widely recognized. It has long been recognized that high blood lead levels in children lead to hyperactivity, aggressiveness, and mental retardation. Only recently, however, has it been recognized that much lower

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levels of lead in the body may also have adverse cognitive and behavioral effects. Clinical lead toxicity is usually thought of as being found only in persons with unusual exposure to high levels of lead, such as smelter workers or children who eat flakes of heavily leaded paint from inner city slum dwellings. There are, however, many other sources of environmental lead, including some that are almost impossible to avoid, such as lead from soldered tin cans or automobile exhausts. Automobile exhaust lead is especially dangerous, because the particle size is very small, and the route of intake--lung tissue--is highly sensitive to even small amounts of lead (Clinton, 1950).

The lead burden of the human body may be increasing at a rapid rate due to industrialization. Ericson, Shirahata, and Patterson (1979) found that the bones of ancient Peruvian Indians contained less than 1/500th as much lead as is contained in the bones of persons who have died recently.

Although lead is the metal that has received the most attention, other metals can also be neurotoxic, and are being increasingly implicated as causes of physical and behavioral disorders. It has been reported that mercury, cadmium, copper, and to some extent, aluminum have provoked "mental" problems (Pfeiffer, 1972, 1978; Schroeder, 1973; Rees, 1979, 1980). The increased use of copper plumbing throughout the U.S. since World War II is of special interest, since it has been found that copper causes a variety of problems, including depression, irritability, and hyperactivity. It has also been reported that copper acts synergistically with artificial food additives, so that individuals with high copper levels may become hyperactive at even low levels of these additives (Brenner, 1977).

One method of determining the levels of lead and other metals in the body is through hair mineral analysis, a sensitive laboratory process in which a small sample of hair is tested. In a study of subclinical lead toxicity, Moore

and Fleischman (1975) determined that degradation in hand/eye coordination on a pursuit rotor task could clearly be seen at a mere 10 parts per million of lead in the hair. These authors noted that this was "probably less than the average lead burden in the U.S., and implies far more widespread toxicity than has been previously supposed." Gordus, Maher, and Bird (1973) reported some association between hair mineral levels and grades at the Naval Academy.

Pihl and Parkes (1977) on analyzing hair samples from 31 learning-disabled and 22 normal students, reported that they could classify the two groups with 98 percent accuracy by using only the hair mineral content to predict learning disability.

In their study of subclinical lead level as related to cognitive and sensory motor impairment in Black preschoolers, Perino and Ernhart (1974) reported that the lead levels found in their sample of 80 Black preschool children were "below the criteria set for lead poisoning, but...as lead levels increased, general cognitive, verbal, and perceptual abilities decreased." Learning dysfunction is only indirectly related to aberrant forms of behavior. More directly relevant to the subject at hand is the Needleman et al. study (1970). Needleman and his colleagues evaluated children with elevated lead levels on psychological test performance and classroom behavior.

They reported that the performance of high-lead-level children was significantly worse than that of the low-lead-level children on all of the following factors on a teachers' behavioral rating scale: distractability, lack of persistence, dependability, hyperactivity, impulsiveness, frustration level, day-dreaming, inability to follow simple instructions, and overall functioning.

The link between biochemistry and nutrition and violent behavior is, as

evidenced throughout this review, far from totally understood. A connection does, however, appear to exist; the nature and further implications of which will become more clear with continued, judicious application and rigorous scientific study.

Meanwhile, as Leonard Hippchen (1978, 1980) points out, biochemistry can make four major contributions toward ameliorating the problem of violence: 1) development of a holistic framework for comprehending violence, encompassing the total interaction of its biological, sociological, psychological, and cultural aspects; 2) treatment and rehabilitation of violent individuals within institutions; 3) development of programs which assist in the early detection of the violence-prone individual and divert criminal offenders from the criminal justice system; 4) aid in the primary prevention of violence by supplying community groups, physicians, schools, and parents with the nutritional information which will assist them in promoting healthy child development.

DRUGS

Drugs, including alcohol, are the chemical substances most clearly associated with aberrant or violent behavior (Shupe, 1954, Wolfgang, 1958; Hollis, 1974; Tinklenberg, 1970, 1973, 1974; Taylor et al., 1975, 1976). Sydney Cohen described the ways in which drugs can alter behavior before The California Commission on Crime Control and Violence Prevention (December, 1980). According to Cohen, drugs can: 1) reduce one's control over one's behavior, a condition referred to as behavioral toxicity; 2) impair judgement and motor skills; 3) produce hyperactivity, irritability, and impulsivity; 4) produce paranoid thinking patterns and perceptual distortions; 5) encourage hostility by eliminating normal levels of caution and prudence; and 6) lead to illegal acts to procure more drugs to eliminate the craving experienced during withdrawal.

The nature of the relationship between drugs and violence is far more complicated than simple "cause-and-effect." Most persons use drugs of one sort or another during their life-time and are never violent; most individuals who commit a violent act while under the influence of drugs do not do so every time they use drugs. Powers and Kutash (1978) explain differential responses to drugs according to five interactive factors: user personality, drug dosage, expectations, environmental setting, and drug type.

User Personality: Those individuals whom, for a multitude of reasons, suffer inadequacies in ego functioning are likely to seek ways of altering their internal experience. Thus, personality inadequacies may lead to a greater utilization of drugs and to a greater potential for violence once drugs are abused.

Inadequate, anti-social and psychotic personalities are clearly associated with substance abuse and violence (Roebuck and Johnson, 1962; Nicol et al., 1973; Mayfield, 1976, Hanks and Rosenbaum, 1977). Paradoxically, the rigid over-controlled personality type is also likely to exhibit violent tendencies under the influence of certain drugs, most typically depressants. Megaree (1966) hypothesizes that the repressed hostilities of these individuals "build up" over time and "explode" when drugs release normal inhibitions.

Drug Usage: Markedly different psychoactive effects occur with dosage variations from high to low levels. Frequency and methods of use are also important contributing factors.

Expectations: A person's mind set or expectation of the drug experience can affect his or her behavior. If the individual anticipates a jovial, positive drug experience, it is more likely to occur. Understanding the effects

of the particular drug, and possessing a non-apprehensive attitude toward it may reduce the potential for negative reactions.

Environmental Setting: Reactions to drugs are often situationally specific. The physical, cultural and interpersonal environment may contain elements which contribute to violence. The physical environment may include deprivations causing discomfort and/or frustrations which lead to violence; the cultural environment may contain a positive sanction or propensity for violence; and the interpersonal environment may lack good object relations or the stabilizing influence of concerned others.

Drug Type: The four primary drug classifications, in order of their degree of association with violence, are: depressants (e.g., sedatives, tranquilizers, alcohol); stimulants (e.g., amphetamines); narcotics (e.g., heroine, codeine, morphine, opium); and the hallucinogens (e.g., marijuana, LSD, PCP). These drugs may be directly related to violent behavior but more typically they result in violence due to their interaction with the factors previously outlined.

Depressants. Depressants are the drugs most widely associated with violence and anti-social activity. The most widely used drug in this category and thus the one of primary concern, is alcohol. Alcohol is consumed in varying degree by about 85 percent of the persons in this country at some time in their lives. Sixty to Sixty Five percent of the U.S. population uses alcohol routinely although not chronically. A high percentage (57 to 87 percent depending on the crime and the study) of the most violent crimes - rape, assault, and homicide - are committed under the influence of alcohol (Tinklenberg, 1969, 1973; Wolfgang, 1958; Schuckit, 1980).

A classic study by Shupe (1954) looked at the blood alcohol content of 822 persons apprehended for felony crimes. He determined that medium alcohol dosage levels were most related to violence, accounting for 44 percent of the robberies, 58 percent of the assaults, and 53 percent of the murders--82 percent of those in his sample who had been involved in violent crime. Small amounts of alcohol appear to produce a tranquil effect while larger doses render the drinker physically incapable of assaultive action (Shupe, 1954; Taylor et al., 1975, 1976).

Alcohol is also implicated in a large percentage of less violent crimes, such as industrial, leisure, home, and traffic accidents (McFarland, 1964; Flyman, 1968; Blum, 1967, 1969).

In some types of violence, the alcohol consumption of the victim is a contributing factor. Jared Tinklenberg (1973) discusses the common misconception that victims are passive recipients of violent acts. According to Marvin Wolfgang (1967) victims are often the initial precipitators of violence. He reports that alcohol had been used by victims significantly more frequently in the "victim-precipitated-homicide" situation than by victims who did not provoke assault. This, combined with findings that 24 to 87 percent of victims studied had ingested alcohol (Bensing and Schroder, 1960; Wolfgang, 1958; Bissell, 1965), indicates that "alcohol may sometimes play a critical role in initiating certain types of violent interaction." (Tinklenberg, 1973;199).

The relationship between alcoholism and violence has also been explored at great length. All studies report a significant association, both in terms of committing violent acts (McGeorge, 1963; Clark et al., 1965; Scott, 1968) and dying by violent cause (Palola et al., 1962; McFarland, 1968; Blum, 1967, 1969).

Marc Schuckit (1980), in his testimony before The California Commission on Crime Control and Violence Prevention, stated that a person who suffers from brain damage is highly susceptible to violence when intoxicated. Alcohol has a major effect on the brain, affecting nerve cells in the cortex and frontal lobe. These are the areas of the brain considered to be involved with judgment and self-control (Brewer and Perrett, 1971). Accordingly, alcohol can result in brain damage as well as trigger adverse reactions in those already brain damaged.

Kaplan (1971) suggests that cultural stereotypes about drinking behavior may also contribute to violent behavior. If people expect aggressiveness and a general lack of inhibitions to increase with intoxication they may be inclined to fulfill that expectation. Nathan and Lisman (1976, reported in Kutash et al., 1978) found that subjects in their experiment who were told they were drinking alcohol, but were actually drinking tonic water, were more aggressive than those who thought they were drinking tonic water.

Alcohol is most likely to encourage violence in situations which are stressful, frustrating, and competitive (Taylor and Gammon, 1975; Bennett et al., 1969; Schuckit, 1980).

Stimulants/Amphetamines

Amphetamines stimulate the central nervous system and are used by prescription to combat fatigue, depression, and obesity. Also referred to as "speed", amphetamines are habit-forming. Next to depressant drugs, stimulants are considered the most likely to motivate violence and aggression (Goldstein, 1975; Cohen, 1980). Cohen (1980) testified that bizarre, "unexplainable" crimes where, for instance, the victim has been stabbed dozens

of times, are more likely to have been committed by an amphetamine user (or someone taking PCP) than by someone intoxicated by alcohol.

Tinklenberg and Stillman (1970) described the ways in which the pharmacological properties of the drug promote violent behavior. First, amphetamines increase a person's energy level such that the compulsion to "do something" is intense. Second, the drug puts its user in a highly aroused condition.

"In this 'stimulus-bound' state there is a marked decrease in ability to delay responses. Focus is by necessity only on the immediate present, as the rapidity of response precludes recalling past experiences or considering future consequences. Thus possible inhibitions of assaultive behavior are less operative, and attack becomes more likely." (Tinklenberg and Stillman, 1970:332)

Third, the amphetamine user is in a high state of awareness, perceiving many sensory cues simultaneously. In this state, it is easy to misinterpret some of the cues and react inappropriately. Paranoia, an extreme state of perceptual distortion, is common among heavy amphetamine users (Tinklenberg and Stillman, 1970; Powers and Kutash, 1978).

It is contended that the amphetamine user most likely to commit violent acts is the long-term, frequent user. Such individuals are likely to experience a progressive deterioration in their ability to control their own behavior. The "up-down" aspects of the drug mean that at the end of a long run "the user experiences an exacerbation of uneasiness and aching sensations throughout his body and demonstrates extreme irritability and unpredictability. It is during this period of 'coming down,' particularly after a prolonged run, that the user is most prone to assaultive behavior." (Tinklenberg and Stillman, 1969:333)

It is also the long-term, heavy user who is most likely to take amphetamines intravenously. "Shooting speed" magnifies the drug's effect--higher highs.

lower lows (Tinklenberg and Stillman, 1970; Wikler, 1974).

Powers and Kutash (1978) maintain that socially isolated individuals, those without supportive others available are the most prone to violence when taking stimulants. Tinklenberg and Stillman (1970) describe the heavy user's reality as intensely personal and present oriented. Social bonds, ties with the past, cares for the future wither away leaving the person isolated and without solid grounding--certainly a likely candidate for violence.

The pharmacological properties of amphetamines and the sociopsychological milieu of the user act together to create a potentially explosive situation.

Narcotics

Narcotics (opium, morphine, heroin) have a sedative effect, they relieve anxiety and tension, decrease physical drive, and usually create a feeling of euphoria (Brill, 1963; Tinklenberg and Stillman, 1970). Aggressive or violent behavior is, therefore, not likely to result from the pharmacological properties of narcotics. Instead violence may accompany the criminal activity often necessary to procure these drugs, assaults associated with the selling or possession of them and, occasionally, panic reactions to withdrawal symptoms (Powers and Kutash, 1978).

A recent study by The Rand Corporation, authored by Mark Peterson and Harriet Braiker (1980), supports this contention. From data collected on 624 felons serving time in California prisons, the researchers found that 42 percent of their sample were drug users before arrest. Most of these were heroin users. Although users evidenced a higher burglary rate than non-users, non-users were more likely to be involved in extremely violent crime--twice as likely to be involved in murder, three times as likely to commit assault.

Further confounding the picture, Peterson and Braiker found that while drug addicts had a high rate of burglary, drug use ranked second as a factor which determined even this type of crime. A general "self-image of criminality" was the prime predictive factor for those involved in property crime. They conclude that "there is no evidence...that drug users commit more violent crime. Drug use is associated with crime, but it does not appear to be a major determinant of crime." (Peterson and Braiker, 1980)

Hallucinogens

In comparison with the other three classifications of drugs, only a minor association exists between hallucinogens, as a class, and violence. Within this class, in order of their propensity for inducing violence, are PCP, LSD, and marijuana.

Phencyclidine (PCP) abuse appears to be a most serious drug problem today, both in terms of its potential for harm to the user and user injury to others. Of the hallucinogens it is the most likely to lead to violence. Although PCP is a dangerous drug, according to Cohen (1980), only 5 percent of its users engage in violent activity. The violence perpetrated by these few can, however, be extreme.

In a small study recently conducted by Fauman and Fauman (1980) 12 of the 16 chronic PCP abusers interviewed stated they had been involved in violent activity. This miniscule, non-random sample can not be considered representative of the PCP population. Furthermore, all subjects indicated that they were multi-drug users--a condition which confounds measurement of PCP effects and indicates the possibility of pre-existing personality disorders (Pittel and Hofer, 1972).

LSD has a greater potential for triggering violence to oneself and others than does marijuana but is less potentially violence-inducing than PCP (Tinklenberg and Stillman, 1970). In cases where the LSD user has committed violence against another, pre-existing personality disorders appear to be the major predisposing factor (Klee, 1963; Glickman and Blumenfield, 1976).

Regarding LSD and violence, Kutash and Powers (1978) state in summary:

"psychological complications consisting of prolonged psychotic reactions and attempted suicides. Instances of aggression or violence were very rare and consisted mainly of paranoid reactions and the release or expression of pre-existing psychopathic and antisocial tendencies." (1978:333)

Marijuana or Cannabis falls into the category of mild hallucinogen. Its effects vary greatly depending on user expectation, individual chemistry and the potency of the drug (marijuana comes in many different grades of differing strength).

There is a consensus in the literature that marijuana is disassociated with aggression and violence (Eckerman et al., 1971; Goode, 1972; Tinklenberg, 1974a, 1974b, 1976). In fact, marijuana is reported to reduce assaultive tendencies.

"Moderate doses of cannabis generally induce a reduction in the inclination toward intense social interaction, an increase in positive mood states, a reduction in tendencies toward inflicting pain on others." (Tinklenberg et al., 1976:93)

The marijuana smoker may become involved in violent activity inadvertently because of the drug's illegality. That is, procuring the drug may put the marijuana user in contact with people or situations more likely to be violent. This possibility, however, has nothing to do with the properties of the drug itself.

Although drugs are associated with violence, the nature of that association is extremely complex, involving the interplay of numerous drug and non-drug related factors. It can be said that some types of drugs at certain dosage levels, used by certain personality types under some circumstances increase the probability that violence will occur. The interactions of these variables are not sufficiently understood to predict specific acts of violence. Considerable research remains to be done. However, the presence of drugs--especially those of the depressant and stimulant classification--during a high percentage of violent and criminal incidents, suggests that a decrease in drug use might assist in curtailing violence.

BIBLIOGRAPHY

Arnold, L.E., J. Christopher, et al., "Megavitamins for Minimal Brain Dysfunction", Journal of the American Medical Association; 240:2642-2643, 1978.

Baker, G. Letter report to the Bureau of Naval Personnel, Subject: Program at Naval Correctional Center, 1979.

Bennett, R.H., A.H. Buss and J.A. Carpenter, "Alcohol and Human Physical Aggression", Quarterly Journal of Studies on Alcohol; 30:870-876, 1969.

Brenner, A., "A Study of Efficacy of Feingold Diet for Hyperkinetic Children: Some Favorable Personal Observations", Clinical Pediatrics; 16:652-656, 1977.

Brewer, C. and L. Perrett, "Brain Damage Due to Alcohol Consumption", British Journal of Addiction; 66:170-182, 1971.

Bryce-Smith, D. and H.A. Waldron, "Lead, Behavior, and Criminality" The Ecologist; 4:367, 1974.

Cohen, Sydney, Testimony before the California Commission on Crime Control and Violence Prevention, December 4, 1980.

Daniels, David N. and Marshall F. Gilula et al. (eds.), Violence and the Struggle for Existence; Little, Brown and Co., Boston:1970.

David, O.J., J. Clark, and S. Hoffman, "Childhood Lead Poisoning: A Reevaluation," Archives of Environmental Health; 34(2):106-111, 1979.

Dickey, L., Clinical Ecology; Charles C. Thomas, Springfield, Ill.: 1976.

Ericson, J.E., H. Shirhata, et al., "Skeletal Concentrations of Lead in Ancient Peruvians", New England Journal of Medicine; April 26, 1979, 946-951.

Feingold, Benjamin F., Introduction to Clinical Allergy; Charles C. Thomas, Springfield, Ill.: 1973.

----, Why Your Child is Hyperactive; Random House, New York: 1973.

Glickman, L. and M. Blumenfield, "Psychological Determinants of 'LSD Reactions'", Journal of Nervous and Mental Disease; 147:79-83, 1967.

Goldstein, J.H., Aggression and Crimes of Violence; Oxford University Press, New York:1975.

Goode, W.J., "The Place of Force in Human Society", American Sociological Review, 37(5):507-519, 1972.

Gordus, A.A., C.C. Maker, et al., "Human Hair as an Indicator of Trace Metal Environmental Exposure." Proceedings of the First Annual National Science Foundation Trace Contaminants Conference, Oak Ridge National Laboratory, 17:303-321, 1973.

Hanks, S.E. and C.P. Rosenbaum, "Battered Women: A Study of Women Who Live with Violent Alcohol-Abusing Men", American Journal of Orthopsychiatry, 47:291-306, 1977.

Hearing before the Select Committee on Nutrition and Human Needs of the United States Senate, 95th Congress, Diet Related to Killer Diseases, V; June 22, 1977.

Hippchen, Leonard (Ed.), Ecologic-Biochemical Approaches to Treatment of Delinquents and Criminals; Van Nostrand Reinhold Co., New York:1978.

----, "Some Possible Biochemical Aspects of Criminal Behavior", unpublished paper to be presented before the Academy of Criminal Justice Sciences; Philadelphia, PA, March, 1981.

Hoffer, A., Orthomolecular Psychiatry; W.H. Freeman, New York:1973.

Kahan, M., Search and Research: Summaries of Megavitamin Studies; Canadian Schizophrenia Foundation, Regina, 1978.

Kaplan, J., Marijuana: The New Prohibition; Simon and Schuster, New York:1971.

Kershner, J. and W. Hawke "Megavitamins and Learning Disorders: A Controlled Double-Blind Experiment", Journal of Nutrition; 109:819-826, 1979.

Kolata, G., "Behavioral Teratology: Birth Defects of the Mind", Science; 202:732-734, 1978.

----, "Brain Biochemistry: Effects of Diet", Science, 192:41-42, 1976.

Kubala, A.L., and M.M. Katz, "Nutritional Factors in Psychological Test Behaviors," The Journal of Genetic Psychology; 96:343-352, 1960.

Lane, B.A., "The Relationship of Learning Disabilities to Juvenile Delinquency", Journal of Learning Disabilities; 13:425-434, 1980.

Lesser, Michael, Testimony before the Select Committee on Nutrition and Human Needs, United States Senate, 95th Congress, First Session, June 22, 1977.

Levinson, H.N., A Solution to the Riddle Dyslexia; Secaucus, N.J.: Springer-Verlag Co., 1980.

Liggio, F., "Interference in the Performance of the Mental Activities due to the Wrong Diet Which Lacks Protein Factor of Animal Origin and Nervous Disorders Which are Complementary and Reversible," Acta Neurologica; 24(4):548-556, 1969.

Lonsdale, D., and R.J. Shamberger, "Red Cell Transketolase as an Indicator of Nutritional Deficiency", American Journal of Clinical Nutrition; 33:205-212, 1980.

Mayfield, D., "Alcoholism, Alcohol Intoxication, and Assaultive Behavior" Diseases of the Nervous System; 37(5):288-291, 1976.

Mayron, L.W., "Ecological Factors in Learning Disabilities", Journal of Learning Disabilities; 11:495-505, 1978.

Megaree, E.I., "Undercontrolled and Overcontrolled Personality Types in Extreme and Social Aggression", Psychological Monographs; 80: (611, entire issue), 1966.

Moore, L.S. and A.I. Fleischman, "Subclinical Lead Toxicity", Orthomolecular Psychiatry; 4:61-70, 1975.

McFarland, R.A., G.A. Ryan, et al., "Etiology of Motor-Vehicle Accidents" New England Journal of Medicine; 278:1383-1388, 1968.

The National Advisory Committee on Hyperkinesia and Food Additives. Final Report to the Nutrition Foundation, The Nutrition Foundation, Washington, D.C.:October 1980.

Needleman, H.L. et al., "Deficits in Psychologic and Classroom Performance of Children with Elevated Dentine Lead Levels", New England Journal of Medicine; 300:689-695, 1979.

Nicol, A.R., J.C. Gunn, et al., "The Relationship of Alcoholism to Violent Behavior Resulting in Long-Term Imprisonment", British Journal of Psychiatry; 123:47-51, 1973.

Osmond, H., Schizophrenia, Vol. 1, Number 3, 125-132, 1967.

Pauling, Linus, "Orthomolecular Psychiatry," Science; 160:265-271, 1968.

Perino, J. and C.B. Ernhart, "The Relation of Subclinical Lead Level to Cognitive and Sensorimotor Impairment in Black Preschoolers" Journal of Learning Disabilities; 7:616-620, 1974.

Peterson, Mark A. and Harriet B. Braiker, Doing Crime: A Survey of California Prison Inmates; Rand Corporation, R-2200-DOJ, April, 1980.

Pfeiffer, C.C., "Zinc and Other Micro-Nutrients," Keats Publishing, New Canaan, CT:1978.

Pihl, R.O. and M. Parkes, "Hair Element Content in Learning Disabled Children," Science, 198:204-206, 1977.

Pittel, S.M. and R. Hofer, "In Transition to Amphetamine Abuse" in D.E. Smith and D.R. Wesson (Eds.) Uppers and Downers, Prentice-Hall, Englewood Cliff, N.J.:1972.

Powers, Robert J. and Irwin L. Kutash, "Substance Induced Aggression" in Violence, pp 317-342.

Reed, Barbara, Testimony before the Select Committee on Nutrition and Human Needs. United States Senate, 95th Congress, 1st Session, June 22, 1977.

Rees, Elizabeth, Testimony before The California Commission on Crime Control and Violence Prevention, December 4, 1980.

Rimland, Bernard, "High Dosage Levels of Certain Vitamins in the Treatment of Children with Severe Mental Disorders" in Orthomolecular Psychiatry, Linus Pauling and D.R. Hawkins, W.H. Freeman, San Francisco:1973.

----et al., "The Effect of High Doses of Vitamin B6 on Autistic Children: A Double-Blind Crossover Study", American Journal of Psychiatry, 135(4): 472-475, 1978.

----Testimony before The California Commission on Crime Control and Violence Prevention, December 4, 1980.

Rodale, J.I., Natural Health, Sugar and the Criminal Mind, Pyramid, New York:1968.

Roebuck, J. and R. Johnson, "The Negro Drinker and Assaulter as a Criminal Type", Crime and Delinquency, 8:21-32, 1962.

Saifer, Phyllis, Testimony before The California Commission on Crime Control and Violence Prevention, December 4, 1980.

Schauss, Alexander G. and Clifford E. Simonsen, "A Critical Analysis of the Diets of Chronic Juvenile Offenders," Part I, Journal of Orthomolecular Psychiatry, Vol. 8, No. 3, pp 149-157, 1979.

Schauss, Alexander G., "A Critical Analysis of the Diets of Chronic Offenders: Part II" Journal of Orthomolecular Psychiatry, 8:222-226, 1979.

----, Diet, Crime and Delinquency, Parker House, Berkeley: 1980.

Schroeder, H., The Trace Elements and Man, Denver-Adair Co., Old Greenwich, Conn.:1973.

Schuckitt, Marc, Testimony before The California Commission on Crime Control and Violence Prevention, December 4, 1980.

Shaywitz, B.A., N.J. Siegel et al., "Megavitamins for Minimal Brain Dysfunction: A Potentially Dangerous Therapy" Journal of the American Medical Association, 238:1949, 1977.

Swanson, J.M. and M. Kinsbourne, "Food Dyes Impair Performance of Hyperactive Children on a Laboratory Learning Test" Science, 207: 1485-1487, 1980.

Taylor, S.P., and C.B. Gammon, "Effects of Type and Dose of Alcohol on Human Physical Aggression" Journal of Personality and Social Psychology, 32:169-175, 1975.

---- et al., "Aggression as a Function of the Interaction of Alcohol and Threat" Journal of Personality and Social Psychology, 34:938-941, 1976a.

Taylor, S.P. and R.M. Vardaris, et al., "The Effects of Alcohol and Delta-9-tetrahydrocannabinol on Human Physical Aggression" Aggressive Behavior, 2:153-161, 1976b.

Tinklenberg, Jared R., and Richard C. Stillman, "Drug Use and Violence" in Violence and the Struggle for Existence, Daniels et al. (Eds), Little, Brown and Co., Boston:1970.

Tinklenberg, Jared R., "Alcohol and Violence" in Alcoholism, Academic Press Inc., New York: 1973, pp 195-210.

----, Patricia Murphy et al., "Drug Involvement in Criminal Assaults by Adolescents" Archives of General Psychiatry, May, 1974, Vol. 30: pp 685-689.

----, W.T. Roth et al., "Cannabis and Alcohol Effects on Assaultiveness in Adolescent Delinquents," Annals of the New York Academy of Sciences, December 30, 1976; Vol. 282: pp 85-94.

Wacker, J.A., "The Dyslogic Syndrome" The ACLD Key, Texas Association for Children with Learning Disabilities, Dallas, September 1975.

Wallace, J.F. and M.J. Wallace, "The Effects of Excessive Consumption of Refined Sugar on Learning Skills, Behavior Attitudes, and/or Physical Condition in School-aged Children," a booklet prepared for Parents for Better Nutrition, Medford, Oregon, 1978.

Weiss, B., J.H. Williams et al., "Behavioral Responses to Artificial Food Colors" Science, 207:2487-2489, 1980.

Williams, R.J., Biochemical Individuality, Wiley and Sons; New York: 1956

Wolfgang, Marvin E., Patterns in Criminal Homicide, University of Pennsylvania Press; Philadelphia: 1958.

Wolfgang, Marvin E. and F. Ferracuti, The Subculture of Violence, Tavistock, London: 1967.

Wolfgang, Marvin E., The Sociology of Crime and Delinquency, Wiley and Sons; New York:1970.

Wunderlich, Ray C., "Neuroallergy as a Contributing Factor to Social Misfits: Diagnosis and Treatment," In L. Hippchen (Ed.), Ecologic-Biochemical Approaches to Treatment of Delinquents and Criminals, Van Nostrand Reinhold, New York, 1978, 229-252.

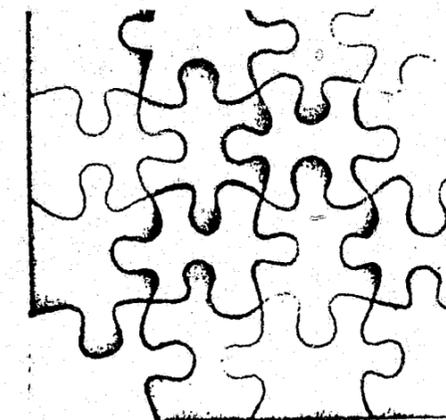
Yudkin, J., Sweet and Dangerous, Wyden Press, New York: 1972.

APPENDIX D

Announcements of Commission Public Hearings

BIRTHING AND INFANT BONDING:

IS THERE A CONNECTION
WITH VIOLENCE
LATER IN LIFE??



CALIFORNIA
COMMISSION ON
CRIME CONTROL AND
VIOLENCE PREVENTION

AN INVITATION TO THE FIRST PUBLIC HEARING OF
THE CALIFORNIA COMMISSION ON CRIME CONTROL
AND VIOLENCE PREVENTION, WHICH IS ENGAGED IN
A THREE-YEAR PROJECT TO DISCOVER ROOT CAUSES
AND WAYS OF PREVENTING VIOLENCE AND VIOLENT
BEHAVIOR. THE COMMISSION NEEDS YOUR HELP
AND YOUR PARTICIPATION IN THESE HEARINGS.

SATURDAY, SEPT. 27, 1980

MOUNT ZION HOSPITAL, 1600 DIVISADERO, SAN FRANCISCO
HERBST LECTURE HALL, 2ND FLOOR, 9 A.M. to 5 P.M.

AGENDA

- 9-9:30 -- KEYNOTE ADDRESS:
ASSEMBLYMAN JOHN
VASCONCELLOS, SAN JOSE
- 9:30-11 -- EXPERT WITNESS
TESTIMONY
- 11:15-12:15 -- PANEL OF EXPERT WIT-
NESSES AND VIOLENCE
PREVENTION COMMISSIONERS
- 12:30-1:30 -- PUBLIC AND COMMISSIONER
QUESTIONS FOR WITNESSES
- 2:00-5:00 -- PUBLIC TESTIMONY (LIMIT
OF 5 MIN. PER PERSON IS
NECESSARY--WRITTEN MA-
TERIAL GLADLY ACCEPTED)

EXPERT WITNESSES

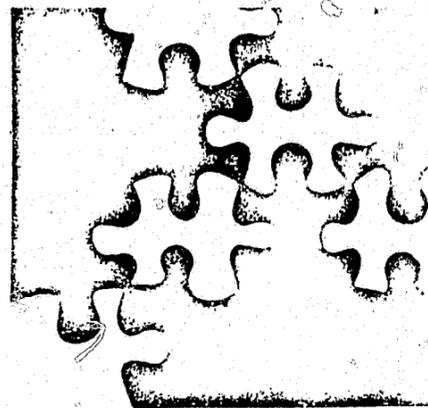
- SUZANNE ARMS--Author, feminist, founder of
The Birthplace, Palo Alto
- DORIS HAIRE--President International Child-
birth Association
- NANCY IRWIN, MSSA--Child Psychotherapist, re-
searcher, Alternative Birth Center, Mt. Zion
- P.H. LEIDERMAN, Ph.D.--Dept. of Psychiatry &
Behavioral Sciences, Stanford Med. School
- LEWIS MEHL, M.D., Ph.D.--Psychophysicologist,
Kaiser-Permanente; Researcher, Psycho-
physiology Research Center, Berkeley
- SUSAN O'CONNOR, M.D.--Pediatrician, Nashville
Gen. Hospital, Vanderbilt Medical School
- ROBERT ROTH, M.D.--Coordinator, New Born
Services, Mount Zion Hospital, S.F.
- MADLINE SHEARER--Editor, Birth and the Family
Journal; Physical Therapist and expectant
parent educator

FOR FURTHER INFORMATION,
CALL (916) 322-0147

CALIFORNIA
COMMISSION ON
CRIME CONTROL AND
VIOLENCE PREVENTION
7171 BOWLING DRIVE, SACRAMENTO, CA 95823.

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NUTRITIONAL AND BIOCHEMICAL INFLUENCES
ON AGGRESSIVE AND VIOLENT BEHAVIOR



CALIFORNIA
COMMISSION ON
CRIME CONTROL AND
VIOLENCE PREVENTION

AN INVITATION TO THE SECOND IN A SERIES OF PUBLIC HEARINGS SPONSORED BY THE CALIFORNIA COMMISSION ON CRIME CONTROL AND VIOLENCE PREVENTION. THE COMMISSION IS CONDUCTING A THREE-YEAR INVESTIGATION TO FORMULATE WAYS OF PREVENTING VIOLENT BEHAVIOR THROUGH THE DISCOVERY OF ITS ROOT CAUSES. IN ORDER TO SUCCEED, THE WORK OF THE COMMISSION MUST INCLUDE YOUR HELP AND PARTICIPATION.

THURSDAY, DECEMBER 4, 1980
UNIVERSITY OF SAN DIEGO, LINDA VISTA ROAD & MARIAN WAY
ALCALA PARK, U. S. D. SCHOOL OF LAW, MORE HALL
12:30 P.M. TO 10:00 P.M.

AGENDA

EXPERT WITNESSES

- 12:30 - 1:00 -- KEYNOTE ADDRESS:
CLARENCE M. PENDLETON, JR.
PRESIDENT, URBAN LEAGUE
OF SAN DIEGO
- 1:00 - 5:00 -- EXPERT WITNESS TESTIMONY*
- 5:00 - 6:30 -- DINNER BREAK
- 6:30 - 8:00 -- EXPERT WITNESS TESTIMONY*
- 8:00 - 10:00 -- PUBLIC TESTIMONY (LIMIT
OF 5 MINUTES PER PERSON IS
NECESSARY--WRITTEN MATERIAL
GLADLY ACCEPTED)

SIDNEY COHEN, M.D. - PROFESSOR OF PSYCHIATRY,
UNIVERSITY OF CALIFORNIA MEDICAL SCHOOL,
LOS ANGELES.

ELIZABETH REES, M.D., F.A.A.P. - PRIVATE
PRACTICE OF PEDIATRICS AND ORTHOMOLECULAR
MEDICINE, CASTRO VALLEY; FOUNDING MEMBER
AND VICE PRESIDENT, ORTHOMOLECULAR MEDICAL
SOCIETY.

BERNARD RIMLAND, Ph.D. - DIRECTOR, INSTITUTE
FOR CHILD BEHAVIOR RESEARCH, SAN DIEGO.

PHYLLIS SAIFER, M.D., M.P.H. - PRIVATE
PRACTICE OF ALLERGY AND CLINICAL ECOLOGY,
BERKELEY, CA; BOARD MEMBER OF THE SOCIETY
FOR CLINICAL ECOLOGY.

ALEXANDER SCHAUSS, M.A. - DIRECTOR, AMERICAN
INSTITUTE FOR BIOSOCIAL RESEARCH; AUTHOR
OF ORTHOMOLECULAR TREATMENT OF CRIMINAL
OFFENDERS, AND DIET, CRIME AND DELINQUENCY.

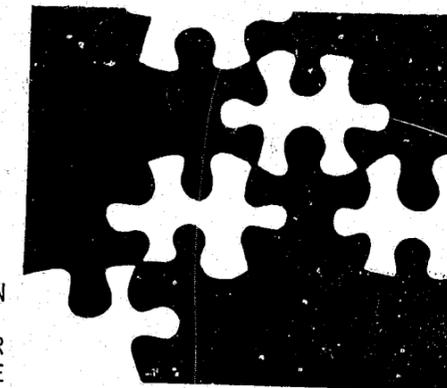
MARC SCHUCKIT, M.D. - DIRECTOR, ALCOHOL
TREATMENT PROGRAM, SAN DIEGO VETERAN'S
HOSPITAL; PROFESSOR OF PSYCHIATRY, UNIVERSITY
OF CALIFORNIA MEDICAL SCHOOL, SAN DIEGO.

*TIME WILL BE ALLOWED AFTER EACH WITNESS' TESTIMONY FOR QUESTIONS FROM COMMISSIONERS AND THE PUBLIC.

FOR FURTHER INFORMATION,
CALL (916) 522-0147

CALIFORNIA
COMMISSION ON
CRIME CONTROL AND
VIOLENCE PREVENTION
7171 BOWLING DRIVE, SACRAMENTO, CA 95823

THE BIOLOGICAL ASPECTS OF VIOLENT BEHAVIOR



CALIFORNIA
COMMISSION ON
CRIME CONTROL AND
VIOLENCE PREVENTION

AN INVITATION TO THE THIRD IN A SERIES OF PUBLIC HEARINGS SPONSORED BY THE CALIFORNIA COMMISSION ON CRIME CONTROL AND VIOLENCE PREVENTION. THE COMMISSION IS CONDUCTING A THREE-YEAR INVESTIGATION TO FORMULATE WAYS OF PREVENTING VIOLENT BEHAVIOR THROUGH THE DISCOVERY OF ITS ROOT CAUSES. IN ORDER TO SUCCEED, THE WORK OF THE COMMISSION MUST INCLUDE YOUR HELP AND PARTICIPATION.

CYPRESS COMMUNITY COLLEGE
9200 VALLEY VIEW
CYPRESS (ORANGE COUNTY);
UNIVERSITY THEATER
(714) 826-2220

HEARING AGENDA

THURSDAY, JANUARY 29, 1981

FRIDAY, JANUARY 30, 1981

8:30A.M. - 3:30P.M.

9:00A.M. - 11:00A.M.

EXPERT WITNESS TESTIMONY --

EXPERT WITNESS TESTIMONY --

- BRAIN DYSFUNCTION
- HORMONAL ABNORMALITIES
- GENDER DIFFERENCES
- GENETIC FACTORS, INCLUDING
CHROMOSOMAL IMBALANCE
- HYPERACTIVITY AND LEARNING
DISABILITY

--SEXUAL AND TACTILE DEPRIVATION,
AND NEUROLOGIC ABNORMALITIES

11:00A.M. - 12:00P.M.

PUBLIC TESTIMONY

3:45P.M. - 5:00P.M.

PUBLIC TESTIMONY - LIMIT OF 5 MINUTES
PER PERSON IS NECESSARY--WRITTEN
TESTIMONY GLADLY ACCEPTED.

CALIFORNIA
COMMISSION ON
CRIME CONTROL AND
VIOLENCE PREVENTION
7171 BOWLING DRIVE, SACRAMENTO, CA 95823
(916) 322-0147

APPENDIX E

Newspaper Coverage of Commission
Activities

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"TACKLING THE ISSUES OF VIOLENCE, from San Francisco Examiner

"EXPERT: UNTESTED DRUGS POSE THREAT TO NEWBORNS, from the Peninsula Times Tribune, Monday, September 29, 1980

S.F. HEARING ON CAUSES OF VIOLENCE, from San Francisco Chronicle, September 26, 1980

STATE COMMISSION ON CRIME CONTROL TO MEET, from The Los Angeles Times, Sunday, October 19, 1980/Part VII

POLICE CHIEF STROH NAMED TO NEW CRIME COMMISSION, from The Los Angeles Times, September 4, 1980

LET'S TRY PREVENTION; CRIME CURES DON'T WORK, from San Jose Mercury December 21, 1980

ALLERGIC TO NON-VIOLENCE? DIET MAY BE FACTOR IN CRIME, from San Diego Evening Tribune, December 5, 1980

Letter to the Los Angeles Times, January 7, 1981, in response to an earlier column on violent crime by Los Angeles District Attorney John Van de Kamp

END