Crime, Malnutrition, and Other Forms of Cerebral Trauma

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It is my intention in giving this paper to set the scene for the following papers and discussions.

Crime, in the minds of most people, is becoming an increasingly serious problem. Whilst the majority of crimes are on the increase, it is those involving violence which cause us the most concern. However, that increase is not so apparent when we turn from the newspapers to hard statistics. From 1966 actual offences increased from 1,094,889 to 1,809,135 in 1973. The percentage of violent crimes remained relatively constant varying from 6.7 to the low point of 6.3 percent in 1973 (Statistics Canada). The increase in absolute numbers of crimes committed is of course offset to some degree by the increase in population, but the increase must remain as a cause for concern by reason of its cost in human wastage, distress, and the cost to our economy.

To attempt to define crime is a difficult if not impossible task. It is a task faced by sociologists for decades in their consideration of norms and deviancy, and these studies have taken them beyond the study of external behavior to the motives which impel that behavior. The basic norms of motivation are variously seen as having "social utility" (Pareto, 1935), or as adaptive and keeping society in touch with reality and contributing to its survival (Summer, 1906). Almost all societies have become dynamic as we have entered the age of science. Science itself adheres to the basic ethos of experiment, innovation, and change. The latter inevitably causes conflict with preexisting norms.

This is not to argue that crime, which is a violation of normal behavior as decreed in our Criminal Code, is a basically beneficial manifestation of desirable change, but rather that it is a consequence of it, a price to be paid. We, as scientists and citizens, must aim at reducing that price lest we bankrupt our society.

It can be viewed also as a warning to the effect that change is proceeding in the wrong direction or at the wrong pace, and we must resort to sanctions—i.e., those mechanisms which enforce the normal. They may consist of reward or punishment, and considered broadly they are understandable. The law provides the most formal of such sanctions.

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The study of those who are intentionally deviant is more the province of those studying socioeconomic conditions. The bank worker who programs his computer to his own profit is scarcely abnormal. The loss of money experienced by banks in the United States as a result of the manipulations of their own employees amounts to six times the amount lost by robbery. It is suggested that in this form of white collar crime we are likely to find a relatively small number of malfunctioning individuals. Rather, we should look for defects in the values of our society.

Because we, as behavioral scientists, cannot embrace all problems it behooves us to concentrate our studies on those who contravene our laws unintentionally. There is of course an overlap in these two types of criminals.

Simply, violations of the norm occur:

(1) when the reward is worth the risk;
(2) when conditions overwhelm the individual, in which case we take them into account as extenuating circumstances;
(3) when the individual and society in their dynamic relationship cannot exercise sufficient control.

The Criminal Code allows a crude measure to be applied with the finding of "not guilty by reason of insanity." It is with regard to categories (2) and (3) that we, as behavioral scientists, should devote most of our efforts, making available our findings to those who determine socioeconomic conditions.

What factors then make the individual incompetent to control his behavior under the pressure of varying circumstances? The most basic factor is the limitations imposed upon his constitution—i.e., his basic biological makeup. The early speculation that criminal behavior related to constitution and thus heredity grew out of the study of phrenology in the early 19th century, and in 1876 Lombrosso presented the doctrine of "criminal atavism" in an attempt to relate criminal behavior to atavistic traits, supposedly identifiable by identifying groups of criminals and other "deviants" with what were then considered to be primitive peoples on the evolutionary scale. Those early studies, which now appear ridiculous to us, may well have contained a germ of truth, but they failed to take into account or else they misinterpreted the effects of socioeconomic conditions.

Recent studies indicate a wide variety of psychiatric conditions to be associated with criminal behavior. Hill (1953) found an association between epilepsy and murder, and Gunn (1969) showed that a larger number of epileptic males were taken into custody than would have been expected by chance. The association of the XYY chromosomal pattern with criminal behavior is well established (Jacobs et al., 1965; Nielsen, 1971), and this abnormality appears to be associated with impulsivity. Dewhurst et al. (1970) showed that Huntington's Chorea is associated with antisocial and violent behavior, those two behaviors precipitating half the admissions of these patients.

These examples of constitutional limitations fall largely into the congenital category. With respect to acquired constitutional changes we must consider the effects upon cerebral function of various chemicals—i.e., the illicit drugs and alcohol. The latter can be recognized as a form of malnutrition even if its consumption is a societal norm. The striking increase in homicide in New York has been associated with the increase in drug use (Helpern et al., 1972). The association between alcohol abuse, drug abuse, cerebral dysfunction, and cerebral trauma is too well known to warrant further discussion.

The above causal links between constitutional limitations (or cerebral trauma) and criminal behavior are clear, but they do not account for the larger portion of criminal or violent behavior. To consider the constitutional cerebral basis for this behavior we have to venture into the study of that vague clinical entity of psychopathy or sociopathic personality. Admittedly, the clinical boundaries of this group are blurred, and at least a part of the question of its definition is begged by the occurrence of

criminal behavior. Gaze et al. (1974) found that 37 percent of sociopaths had committed felonies compared with 13 percent of alcoholics and 23 percent of drug dependents in a survey of 500 patients in the Washington School of Medicine.

The constitutional basis of the socio-pathic individual has been well explored, at least in such areas as those of reactivity and cerebral activation levels. The work of Tonge (1958) amongst others showed that the worst and most persistent offenders tended to show little autonomic response to conditioned stimuli, using galvanic skin recording technique.

Recently more specific aspects of deviant behavior have been investigated using more precise psychophysiological techniques, and considerable evidence is emerging which is of aid in localizing cerebral dysfunction and in relating those dysfunctions to fairly specific forms of deviant behavior. Klonoff et al. (1970) reported 80 percent of schizophrenics to have scores on the Halstead Reitan Battery effecting mild to moderate brain dysfunction. Flor-Henry (1973) has reviewed evidence which with some authority suggests that lateralized brain dysfunction of the fronto-temporal-limbic system is significantly related to various psychopathological groups, particularly the functional psychoses and psychopathy (or sociopathic personality). Dysfunction appears to be lateralized to the dominant hemisphere in the schizophrenic and psychopath. Further validating studies must be conducted before this hypothesis is fully proven but the prevailing arguments are strong.

The discussion thus far has indicated that criminal behavior and cerebral dysfunction are linked together in at least some manifestations, notably impulsivity. That mental illness is prevalent amongst convicted criminals is indicated by the statement of Chalke et al. (1972) to the effect that at least 30 percent of serving prisoners are suffering from some degree of mental illness. An estimated 5 percent of Alberta's probationers require or receive treatment (Solicitor Generals' Department, 1975), this estimate being based upon the judgment of probation officers. The figure is probably an underestimate because of relatively low availability or usage of service and the fact that forensic behavioral services are only beginning to emerge as a need.

If, as has been argued, constitution is the basis of at least some criminal behavior then the determinants of constitution must be considered. In this area of inquiry, genetics, nutrition, and life experience are of paramount importance. Much has been written about the genetics of deviant behavior, but apart from these biochemical disorders manifesting as severe mental deficiency the picture remains somewhat obscure. That genetics plays a part in the incidence of schizophrenia is shown by the work of Gottesman (1966) and Heston (1966), but the exact causative relationship between genes and the disorder remains obscure.

To understand the failings of many previous claims on behalf of heredity we must return to consideration of the socioeconomic environment. In the past too little credence was paid to the fact that the deviant were usually raised in the same environment as their parents and that they were thus subjected to those same physical and emotional causes of cerebral trauma. Impulsive crimes tend to occur amongst the lower socioeconomic classes. Even that commonly indicated group—i.e., youth —when deriving from higher socioeconomic classes tend to indulge in less serious crimes as demonstrated by Tobias and Denomme (1973). Of 16 reasons identified for this behavior none apart from alcohol consumption can be levelled at cerebral trauma.

The lower socioeconomic classes are undoubtedly most deprived in their simple physical requirements, notably food, clothing, and shelter. Cultural deprivation must also exist, but without the basic requirements of a sound constitution they are doubly penalized in that they lack the basic building materials of a sound constitution which

would allow them the best chance of overcoming their cultural frustrations. Reference to **Nutrition Canada** indicates ample evidence that serious deficiencies exist, predominantly in the lower socioeconomic groups, with respect to protein, vitamins, and the intake of other essential materials.

Montague (1972) has discussed the concept of sociogenic brain damage and points out that protein calorie deficiency in the pregnant female can affect not only the health of her own child but also the germ cells of the grandchildren.

The problems of deciphering the effects of malnutrition have been described by the Committee on International Nutrition Programs (1974), but within this discussion the importance of the interaction of nutrition and social environment is apparent.

The author has argued elsewhere that cerebral trauma delivered via the media of food deprivation or direct trauma is likely to produce constitutionally less viable citizens, and through the effects on their children there is, at least, the potentiality for an exponential rather than a geometrical increase in deviancy. We must also remain cognizant of the fact that some eminent authorities—e.g., Pauling (1973) —contest the established necessary intake levels of specific foodstuffs.

At this point in the discussion a philosophical point must be raised. Before we attempt to eliminate that which we currently recognize as criminal behavior, we should consider its possible biological importance. As discussed, science depends upon deviation for its dynamic nature. It is postulated here that deviancy, even of the impulsive variety, may have some evolutionary importance. Perhaps the grand design of nature has provided for us in such a way that in the face of adversity, impulsivity or the ability to react rapidly and selfishly is important for survival. In the face of a cataclysm, who can say which personality type is most likely to survive: the quiet, controlled, "normal" citizen, or the selfish, impulsive psychopath?

Possibly criminal behavior represents by and large a regressive but protective mechanism in the sense of Hughlings Jackson.

In the face of cerebral or constitutional adversity, possibly nature leaves us with our more base instincts for personal survival. If indeed this is the case, then we can still only regard crime as an undesirable anachronism in that we are now facing problems of survival which go beyond those of personal considerations.

How, then, can we combat crime? We must obviously research and plan carefully the socioeconomic structure of our society, eliminating frustrations, prejudice, and deprivation in consideration of future generations. We must attempt to eliminate destructive and anachronistic behavior, recognizing that in doing so we have to be extremely careful with respect to our definitions lest individuals and group rights be violated. There can, however, be little danger of such violations in insuring adequate nutritional standards and in the treatment of nutritional defects. Scriver (1974) points out that as genetic disorders of metabolism come to light so do dietary methods of treatment.

The concept of vitamin-dependent disease as postulated by Hoffer (1973) represents an innovative and promising exploration of this nutritional approach to the elimination of deviant behavior. This and other types of biological intervention aimed at restoring cerebral integrity must be supplemented with social measures of rehabilitation, the latter making restitution for the disadvantages experienced by the "criminal" during his period of debilitation.

This is not to argue that all criminals are to be considered ill, but rather it is a plea to redefine crime, to research its causes and find new methods of eliminating it. During this process there will remain a need for improved detection, particularly of potential offenders, security measures for society, and enforced rehabilitative measures which hopefully will continue their evolution

towards treatment and rehabilitation. We are faced, therefore, with a need for expanded and improved services in virtually all forensic areas, and then perhaps one day we will arrive at a time when there can be dynamic and beneficial change in society without the need for conflict and the consequent necessary laws to control it.

REFERENCES

"Annual Publications of Crime Statistics." Statistics Canada, Catalogue No. 85-205.

PARETO, V.: General Treatise on Sociology. Harcourt, New York, 1935.

SUMMER, W. G.: Folkways. Ginn, Boston, 1906.

HILL, D.: "Psychiatric Disorders of Epilepsy." Medical Press 229, pp. 473-5, 1953.

GUNN, J. C: "The Prevalence of Epilepsy Amongst Prisoners." Proceedings of the Royal Society of Medicine 62, pp. 60-63, 1969.

JACOBS, P. A., BRUNTON, M., MELVILLE, M. M., BRITAIN, R. P., and McCLEMONT, W. F.: Nature 208, p. 1351, 1965.

NIELSEN, J.. British Journal of Psychiatrv 119, pp. 503-12, 1971.

DEWHURST, K., OLIVER, J. E., and MCKNIGHT, A. L.: British Journal of Psychiatry 116, pp. 255-258, 1970.

HELPERN, M., DEVLIN, J. F., and EHENREICH: New York Journal of Medicine 72, pp. 2154-57, 1972.

GAZE, S. B., WOODRUFF, R. A., and CLAYTON, P. J.: Journal of the American Medical Association 227, pp. 641-2, 1974.

TONGE, J.E.: "Stress Reactivity and its Relation to Disorder (Delinquent) Behaviour in Mental Defective Subjects." Ph.D. thesis. Sheffield University, 1958.

KLONOFF, H., FI8IGER, G. H., and HUTTON, G. H.: "Neuropsychological Patterns in Chronic Schizophrenia." Journal of Nervous and Mental Disease 150 (4), pp. 291-300, 1970.

FLOR-HENRY, P.: "Hemispheric Dysfunction and Psychopathology." Prepared for McGill University Symposium on "Transformation of Consciousness." 1973.

CHALKE, R. et al.: The Chalke Report, 1972.

Figures obtained from the Solicitor General's Department, 1975.

GOTTESMAN, I. I.: The British Journal of Psychiatry 112, pp. 809-818, 1966.

HESTON, L. L.: The British Journal of Psychiatry 112, pp. 819-825, 1966.

TOBIAS, J. J., and DENOMME, P.: The Criminologist 8, 28, pp. 22-30, 1973.

Nutrition Canada, a report to the Department of National Health and Welfare, 1974.

MONTAGUE, A.: "Sociogenic Brain Damage." American Anthropology, Vol. 74, No. 5, pp. 1045-1061. October, 1972.

Committee on International Nutrition Programs. Nutrition Today, Vol. 9, No. 9, p. 12, 1974.

PAULING, L.: Executive Health, Vol. 10, No. 1, 1973.

SCRIVER, R. S.: "Inborn Errors of Metabolism: A New Frontier of Nutrition." Nutrition Today, Vol. 9, No. 5, p. 4, 1974.

HOFFER, A.: "Schizophrenia: An Evolutionary Advance." The Journal of Orthomolecular Psychiatry, Vol. 2, Nos. 1 and 2, pp. 39-65, 1973.