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THE CHEMICAL BREW OF CRIMINAL BEHAVIOR

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"The universe," says the physicist, "is a problem in geometry."

"Human behavior," says the biochemist, "is a problem in body chemistry."

The biochemist is a bit too dogmatic in his statement. Not all human behavior is chemically determined, yet there are some rather interesting instances where chemical factors are of great importance. Life, in the final analysis, is a series of chemical reactions: the heart beats because the appropriate chemical stimulants are constantly present in the heart muscle; the brain functions because it has a favorable internal chemical environment.

The great French physiologist, Claude Bernard, in 1860 stated that there are two environments for all living beings—a general environment which is the same for inanimate objects and which surrounds the organism as a whole, and an internal environment in which the living elements of the body are to be found and which exert just as profound an influence on the behavior and character of the individual as does the external environment. Later he spoke of both the plasma and lymph. Finally, he regarded the internal environment as "the totality of the circulating fluids of the organism." Today the internal environment is regarded as the totality of all the chemical materials that go into the composition of the body.

"It is the fixity of the *milieu interieur* which is the condition of free and independent life," Bernard wrote, and "all the vital mechanisms, however varied they may be, have only one object, that of preserving constant the conditions of life in the internal environment." Bernard listed oxygen, water, temperature and nutrient materials (including salts, fats and sugar) as the necessary constants which free the organism from the limitations set by the external world. Today many more factors are included.

For some years past it has been known that there is an intimate relationship between the amount of sugar present in the blood and man's social behavior. J. Wilder has compiled from the literature a list of crimes and other infractions of law committed either under the influence of insulin or in a state of spontaneous hypoglycemia (decrease of normal amount of sugar in the blood). The list includes: disorderly conduct, assault and battery, attempted suicide and homicide, cruelty against children and spouse, various sexual perversions and aggressions, false fire alarms, drunkenness, embezzlement, petty larceny, willful destruction of property, arson, slander, violation of traffic regulations.

Some problem children and delinquents have been found to have a tendency to

hypoglycemia. The lower the sugar level falls the greater is the tendency to commit a criminal act. The normal amount of sugar is from 90 to 110 milligrams per 100 cubic centimeters.

Of course not all physiological processes are always maintained at their proper level. Our blood sugar varies from hour to hour and there are times when it is below normal. As a rule crimes and offenses are committed not in the minor attacks of sugarlessness but in the medium or major attacks. A pronounced fall in blood sugar is manifested by weakness, perspiration, tremor, hunger and certain typical physiological changes.

Among the special criminal acts attempted and committed repeatedly in medium as well as major state of hypoglycemia the following are particularly frequent:

1. Theft, violence, petty larceny in connection with the frantic attempt to secure food, especially sweets. This is chemically motivated by the state of sugarlessness.

2. Violations of traffic regulations. In connection with this there are clashes with traffic policemen or serious accidents. Hypoglycemia in such instances results in impairment of judgment, sensory perception and motor reaction. There is also a release of primitive aggressiveness which further aggravates the original offense.

Aggressiveness is an outstanding characteristic of hypoglycemic generated criminality. A man whose blood sugar fell so low that he began to perspire, also became so violent that he attacked the doorman of his house for no reason whatever. Following this outbreak, during which he was pummeled himself, his anger rose, so did his blood sugar, and he calmed down.

Some cases of homicide for no apparent reason have been explained on the basis of hypoglycemia. A hunter returning with a rifle on his shoulder shot a woman sleeping in a car. When asked why he had done so he said that an impulse came over him to commit the crime. He did not know the woman but the urge to kill was so great that he had to yield to it. An examination of his blood sugar showed a marked depression. Similarly, a diabetic who took too large a dose of insulin picked up a revolver and shot his brother dead for no apparent reason.

Parents who suffer from attacks of hypoglycemia are inclined to cruelty to their children. A woman suffering from such a condition beat her son unmercifully without provocation in one of her attacks. A father almost strangled his daughter during one of these sugarless episodes.

The case is on record of a woman who for years had hysterical attacks in which she felt herself extremely weak, incoherent and emotionally upset. During these attacks she threw dishes and other objects at her husband. Also during these spells she had a great desire for sweets. Many cases of domestic discord are due to undetected hypoglycemia.

One of the most thoroughly investigated subjects ever tried in court, acquitted after the connection between his crime and hypoglycemia could be satisfactorily proved was reported by Hill and Sargent in 1943.

A twenty year old man, living alone with his mother, stabbed her to death with a kitchen knife, inflicting many wounds on her body. In the five days preceding the murder he had worked hard and had had but irregular meals. Also, there had been some quarreling with his mother over money. On the morning of the day of the murder he struck her, a very unusual act for which he apologized. He ate poorly on that day. He had his last carbohydrate meal at noon. Between 9 and 10:30 P.M.

he drank four pints of mild ale. At 11 P.M. there was again a quarrel with his mother over money and she pushed him out of her room. At this moment he suddenly felt thirsty, went to the kitchen to get a bottle opener, saw a knife, and then "something came over" him: "I was like a homicidal maniac." He stabbed his mother to death, then realized what he had done, wiped the knife for fingerprints, washed and dressed, and left the house. There is a gap in his memory for seven hours following the crime. The next day, he gave himself to the police and made a full statement.

After the patient's arrest, his family physician notified the defense that two years prior to the crime a sugar tolerance curve had shown a tendency to hypoglycemia. Hill and Sargent performed a number of tests which showed that the prisoner was definitely suffering from hypoglycemia. They expressed the opinion that his blood at the time of the crime must have been below 100 mgm. and that his brain at that time was functioning abnormally; and that his judgment was impaired at the time. The verdict was: "Guilty but insane."

The relationship between excitement and hypoglycemia is of great importance. Impulsive crimes are often committed in a state of excitement. It is not always easy to say whether the excitement was adequate to the cause or not. The hypoglycemic impulsive crime is also committed in an excited state.

A few of the psychologic traits of hypoglycemia are: impairment of will-power, hazy thinking, loss of associations, impairment of moral sense, impairment of abstractive thinking, irritability, negativism, strengthening of aggressive and sexual drives, imperative hunger, etc. Of all these features, the early loss of spontaneity seems to be the most interesting feature in the psychology of hypoglycemia. Hypoglycemia offers the unusual opportunity of experimentation in criminology.

The first suspicion of hypoglycemia as the cause of criminal behavior appears when the criminal offense does not seem psychologically motivated; when there is amnesia for the whole incident or for single details, or for the time prior to the incident. In addition there are physical symptoms like striking perspiration, tremor and other symptoms of hypoglycemia, such as deep sleep following the criminal offense.

Lack of calcium is another condition productive of antisocial attitudes and actions. Many high strung, very emotionally unstable individuals are victims of calcium starvation. One who is deficient in calcium is deeply affected by environmental changes, temperature variations and noise.

The calcium starved individual cannot stand opposition and criticism. A word of admonition or fault-finding or even a glance or attitude denoting this will cause such a person to react violently. Quite often violent tempers have their roots in calcium deprivation.

It has been noted that the person whose lime level is below normal has a tendency to shout and scream and strike. He throws things about and attacks his aggressor without any sense of judgment arising to inhibit these rapid changes.

One such person, during an interval of extreme calcium deprivation, threw his sister out of the window because of some disparaging remark she had made. Another shot at a group of schoolmates with a gun that was handy at the moment.

The calcium-starved personality is always on edge. At home, a harsh word from any member of the family, at the table, for instance, would result in a plate or knife or some other utensil being hurled at the aggressor. In school a blow, a shout, or a curse would be hurled at a fellow student, or even at the teacher.

Calcium starved individuals have many points in common, such as stature, bodily features and biochemical conditions. It has been found that these individuals form an actual group which can be differentiated by certain stigmas, both physically and biochemically. All such persons, both children and adults, show extreme muscle irritability, and are quite likely to have twitchings of the face and neck.

It has been shown that a decrease in the supply of calcium in the blood results in increased reaction of nerve tissue to an induction current. It is possible that the same factors that bring about muscle irritability also bring about untoward reactions in the nervous system. That is to say, reaction follows stimulus so rapidly that the overt act is committed before reason and judgment can come into play for purposes of inhibition.

There is also a close relationship between endocrine gland activity and aggressive and antisocial activity. The endocrine glands, through their hormones, influence personality by their effects upon all the organs and parts of the body in general and the brain and nervous system in particular. It is generally agreed that behavior, normal and abnormal, is mediated through the brain and nervous system. Thus, thyroxin, parathyrin, adrenalin and cortin as well as the estrogens and androgens, all glandular secretions, have very definite effects on the brain and therefore on the behavior of the individual.

Thus the thyroid and thyroxin increases the excitability and nervousness of the individual; while a lack of it produces a slowing down of thinking and action, a sort of stupidity. A lack of parathyrin causes an increase in sensitivity; the person thus affected is annoyed by sounds and other stimuli. In time he becomes irritable and angry and prone to commit aggressive deeds at the least provocation.

Several years ago a series of interesting observations were carried out by several psychiatrists at Sing Sing Prison. The chemical background of the various types of criminal behavior was investigated. It was found that in cases of robbery and burglary the prisoners usually lacked pituitrin and parathyrin in their bodily chemistry. In criminal actions involving grand larceny there was a lack of parathyrin and pituitrin, but there was an increase in thyroxin and thymus hormones. In petty larceny there was a lack of parathyrin and pituitrin but an increase in thymus secretion. Murderers usually had a decrease in the amount of parathyrin, but there was an abnormal increase in thymus, adrenalin and thyroxin.

Further studies revealed that in fraud there was an increase in thyroxin but a decrease in pituitrin and parathyrin. In forgery there was too much thyroxin and thymus and too little parathyrin. Rapists were found to have an overwhelming supply of thyroxin and estrogens and too little pituitrin. Those prisoners who had been sentenced for assault and battery were found to have too much adrenalin, too much thyroxin and too little pituitrin and the estrogens. When the blood of the Sing Sing inmates was analyzed it was found that the great majority of them had an excessive amount of non-protein nitrogen in the blood; their blood sugar level was too low; their uric acid and cholesterol levels were always above normal.

The biochemical evaluation of the criminal personality and of criminal behavior is still in its infancy. It seems destined to become, in the not too distant future, a very important methodology in the understanding and treatment of criminal actions.