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The Mental Deficiencies

By GEORGE A. JERVIS

THE modern concept of mental deficiency derives its connotations from various disciplines. Sociology contributed from the earliest times the observation that there exists a group of individuals who, since childhood, are socially incompetent and incapable of adequate self-support. With the development of mental testing which permitted of an estimation of various grades of intelligence, the concept gained recognition that social incompetence is often associated with defective intellectual development. Following scientific advances in the field of medicine, it became increasingly clear that some diseases occurring during fetal life or in infancy may eventually result in lesions of the brain with consequent mental defect. Finally, with the advent of the science of human genetics the relevance of genetic factors in determining deviations of intelligence was made understandable.

Taking into consideration the essence of these concepts, mental deficiency may be defined briefly as a condition of arrested or incomplete mental development existing before adolescence, caused by disease or genetic constitution and resulting in social incompetence. This definition includes both the sociological concept which stresses the social inadequacy of the defective, and the psychological concept which is considered in the term "arrested" or "incomplete" mental development. The biological viewpoint is embodied in the mention of genetic factors and diseases.

Intellectual impairment developing after adolescence is not usually known as mental deficiency but as dementia, a differentiation which has been custom-

ary for more than a century in both legal and medical thinking, in spite of its dubious validity.

Thus defined, mental deficiency is not a single condition, but a symptom common to diverse conditions of disparate etiologies and of various manifestations.

DIAGNOSIS

In the recognition of mental deficiency, foremost are the results of psychological examination. The mental age (M.A.) is determined by psychometric tests and the intelligence quotient (I.Q.) calculated as the rapport of the mental age to the chronological age (C.A.):

$$I.Q. = \frac{M.A.}{C.A.} 100.$$

Other factors besides intelligence quotient are taken into consideration, such as educational attainment, emotional reactions, general behavior, and social adjustment. The anamnestic data of both familial and personal history are carefully evaluated. Finally, a complete medical examination is performed, using modern techniques of clinical and laboratory medicine. It is upon the evidence thus collected that the diagnosis is made.

Considerable difficulty is often experienced in diagnosing the borderline cases between "subnormality" and mental deficiency. The criterion of social adjustment is decisive in these instances.

INCIDENCE

In estimating the incidence of mental deficiency, a great deal depends upon the criteria of diagnosis used in the assessment of defective individuals. For instance, if the criterion of social in-

competence is adhered to, the incidence will be higher in a strongly competitive urban environment than in rural communities. If a purely psychological criterion is adopted, the test used and the arbitrary point of demarcation between the defective and the nondefective individual will determine to a large extent percentage figures. If one accepts an I.Q. 75 instead of 70 as the lower limit for the nondefective, the percentage of defective population will be over twice as large. Estimates based on institutional censuses are obviously inadequate and always too low, since only a fraction of the mentally defective population can be institutionalized. Those based on large group testing of school children have their limitations and are perhaps too high. Accurate surveys using modern techniques of securing data and uniform criteria of evaluating intellectual and social development have been few in number and limited in extension.

On the basis of scattered and incomplete data collected from many sources, it may be assumed that the incidence of mental deficiency in the general population can be estimated at 1 per cent. This figure yields a total of one and a half million defectives in the United States.

CLASSIFICATION

A classification of defectives into three groups—idiots, imbeciles, and morons—is generally used. The corresponding terms of low grade, medium grade, and high grade defective are to be preferred. Defined in sociological terms and in the language of the English Mental Deficiency Act (1927), idiots are persons in whose case there exists mental defectiveness of such degree that they are unable to guard themselves against common physical danger. Imbeciles are persons in whose case there exists mental

defectiveness which is so pronounced that they are incapable of managing themselves or their affairs, or, in the case of children, of being taught to do so. Morons are persons in whose case there exists mental defectiveness which, though not amounting to imbecility, is yet so pronounced that they require care, supervision, and control for their own protection or for the protection of others, or, in the case of children, that they appear to be permanently incapable of receiving proper benefit from the instruction in ordinary schools.

In more precise psychological terms, the idiot is a person having a mental age of less than 3 years, or, if a child, an intelligence quotient of less than 20. An imbecile is a person having a mental age of 3 to 7 years inclusive, or, if a child, an intelligence quotient from 20 to 49 inclusive. A moron is a person having a mental age of 8 to 11 or 12 years, or, if a child, an intelligence quotient from 50 to 70 (or 75).

Although of considerable value in dealing with practical problems of the defective, both sociological and psychological classifications have their limitations, being purely descriptive in character. More comprehensive are medical classifications which follow mainly etiological criteria; that is, patients are grouped according to the cause of the defect. It is true that this classification may offer considerable difficulty in individual cases, since etiological data are often scanty and contradictory. In addition, more than one etiological factor may be responsible for the defect in certain cases. However, it is only from a grouping according to etiology that one can expect a better understanding of the problem and a guide to preventive and therapeutic measures.

According to etiology, mental defect can be divided into two large groups—endogenous or primary, and exogenous

or secondary. The latter group, in which the defect is caused chiefly by environmental factors, is subdivided into types according to the agent—infectious, traumatic, toxic, and endocrine—causing the defect. The former group, in which the defect is determined mainly by causes inherent in the genetic constitution of the patients, comprises conditions due to the action of multiple genes or of a single dominant or recessive gene.

GENETIC FACTORS

Multiple genes

The group having mental defect due chiefly to multiple genes comprises a large number of defective individuals characterized by the fact that they are not marked with specific distinction (undifferentiated) and show no clinical manifestations aside from the intellectual impairment (aclinical). Several other terms have been used to denote this type, each term being helpful in further defining it. The term "residual" indicates that this group consists of the defective individuals remaining after specific forms are dealt with. The term "subcultural" was coined by Lewis to indicate that most patients show a mild degree of defect and originate from environments of low cultural levels. The term "familial" indicates that high frequency of defective individuals is found among parents, sibs, and cousins of these patients.

It should be noted, however, that each term is used by various authors with somewhat different connotations.

The incidence of this group is variously estimated at from 30 to 75 per cent of the total defective population, the lower figure being perhaps the best approximation. Mental defect of all grades may be observed, but high grade morons, the "subcultural group," predominate. Antisocial behavior and psy-

chopathic traits are noted occasionally among these defectives, but are by no means the rule.

The diagnosis is made by psychological evaluation and social adjustment criteria. Differentiation between dull normal individuals and undifferentiated high grade morons is often difficult, no exact dividing line existing between the two groups.

Most of these undifferentiated cases represent merely the lower part of the normal frequency distribution curve of intelligence. Assuming that this curve approximates the Gaussian form, a certain number of individuals will be found in the defective range below the approximate line indicating I.Q. 70. They are an integral part of the general population, just as much as individuals of superior intelligence with an I.Q. generally above 130.

From the form of the curve, it is evident that the largest number of these defectives will be in the moron classification with an I.Q. between 50 and 70, and only a very small number at the idiot level with an I.Q. below 20—a fact which appears to correspond to actual observation.

The etiological factors determining this type of defect are a matter of much dispute. One may assume, however, that they are similar to the factors responsible for general intelligence. The available evidence indicates that intelligence depends mainly on the genetic constitution, the combined action of multiple genes, each one alone producing a small effect, being its main determinant. One is on safe ground, therefore, in assuming tentatively that the undifferentiated type of mental deficiency, as many other biological graded characters, is chiefly determined by multiple genes. The frequent familial incidence of this type of defect apparently confirms this genetic hypothesis.

In individual cases, environmental factors such as subcultural milieu and poor hygienic conditions may contribute their part to the causation of the condition. It is, in fact, difficult in many instances to assess the importance of deprivation and malnutrition in the causation of undifferentiated defectives.

Single dominant and single recessive genes

Dominant defects are caused by the presence of a gene which is transmitted from parent to child. The defect is therefore immediately apparent in the family history unless it prevents reproduction. Often the defect occurs in attenuated and incomplete form in one generation and in its severest form in another. The occurrence of sporadic forms is explained by assuming that in these cases the condition is caused by a new mutation in a parental germ cell. Probably not more than 1 or 2 per cent of defectives belong in this group. Among these dominant defects are tuberous sclerosis, neurofibromatosis, and nevroid idiocy—diseases in which mental deficiency is accompanied by skin lesions—and several forms of mental defect characterized by changes of bone structures.

Recessive defects are caused by the presence of two similar genes, one from each parent. In the great majority of cases the parents are carriers of the gene (heterozygous for the gene) and, therefore, normal. There is, in addition, a characteristic distribution of the defect among sibs, statistically 25 per cent of the individuals in the sibship being affected. The defect among sibs is usually sharply segregated; that is, there is a sharp distinction between defective and normal sibs. Finally, the defect being rare, the incidence of cousin marriages among parents of affected children is significantly higher than in

the general population. One can quote, among these conditions, amaurotic family idiocy, gargoylism, phenylpyruvic idiocy, hepatolenticular degeneration, and some forms of diffuse sclerosis.

INFECTIONS

Infection of the nervous system, with consequent damage to the brain and resulting mental defect, may occur during intrauterine life or during infancy and childhood. The degree of brain damage varies considerably according to the type of infectious agent, the severity of the process, and the age of the child at the time of infection.

Syphilitic infection may be transmitted during gestation from the infected mother through the placenta to the fetus. Brain damage to the fetus results in a certain percentage of cases followed later by mental defect.

The incidence of this type varies from 1 to 2 per cent of all defectives. Increasing adoption of prenatal care and routine serological tests of pregnant women as prescribed by law in many states will undoubtedly cause a reduction of these figures in the near future.

Rubella (German measles) infection of the mother during the first three months of pregnancy often results in severe mental deficiency of the child. It is assumed that the rubella virus is capable of producing irreparable damage to the fetal brain. Besides intellectual impairment, patients affected with this type of mental defect often show deafness, congenital anomalies of the heart and of the eyes, and microcephaly.

It is most likely that other virus diseases of the mother during pregnancy, mumps for instance, even when the mother appears to have escaped central nervous system complications, may result in brain damage to the fetus and consequently mental defect in the child. It is a matter of observation that among

mothers of defective and malformed children acute virus diseases during pregnancy are found to have occurred many times as frequently as among mothers of normal children.

ENCEPHALITIS IN INFANCY OR CHILDHOOD

Encephalitis (brain fever) is not rare in infancy and childhood. Many patients make a complete recovery, others die during the acute phase of the disease, but a certain number recover with sequelae, among which mental defect is one of the most common. It is estimated that in from 10 to 20 per cent of all institutionalized defectives, encephalitis is directly responsible for the mental defect. Encephalitis may be caused either by viruses or by bacteria. During the last few years the increasing use of antibiotic treatment of the acute phase of the disease has resulted in a decrease of death rate but in a noticeable increase of the number of partially recovered, defective, patients.

The degree of mental defect in post-encephalitic children varies considerably from case to case. Often there is noted a peculiar pattern of behavior marked by episodes of overactivity, restlessness, impulsiveness, assaultiveness, and wanton destruction.

POSTTRAUMATIC MENTAL DEFECT

Cerebral trauma occurring during birth is of considerable importance in the causation of mental defect. Reliable data as to the frequency of this condition among defectives are not available, and estimates vary widely from 10 to 50 per cent. If strict criteria are used in the evaluation of the history of trauma at birth, the incidence is not above 20 per cent in institutionalized defectives.

The importance of birth trauma is shown by the fact that trauma is responsible for the death of over half of

the infants dying at birth or shortly after birth. Difficult labor and prematurity are the most frequent immediate causes of birth trauma, the former because of the mechanical injury, the latter because of the immaturity of the brain which makes it more prone to damage and hemorrhages.

Birth trauma produces damage to the brain either by asphyxia or by hemorrhage. Asphyxia may be caused by premature separation of the placenta, cord complication, overdosage of analgesic drugs given to the mother during delivery, or delayed breathing of the newborn. Asphyxia must be present for a relatively long period in order to produce irreversible damage to the brain.

Hemorrhage within the brain or its envelopes is brought about by direct trauma, caused for instance by forceps, or by tears in one of the membranes of the brain, the tentorium, caused by compression of the head during its passage through the pelvic canal.

It should be noted that more than half of the children showing clinical evidence of birth injury are not mentally defective.

TOXIC MENTAL DEFECT

The importance in the etiology of mental deficiency of toxic factors transmitted from the mother to the child during pregnancy is still unsettled. That type of severe intoxication of obscure origin known as eclampsia, which occasionally occurs in pregnant women, may result in defective children. There is reason to believe that toxic drugs taken by the mother during pregnancy may injure the brain of the fetus, but what drugs are most dangerous in this respect and what doses are necessary to produce fetal damage are still unanswered questions.

X rays are markedly toxic to the developing central nervous system. Several cases have been reported of

mentally defective children showing microcephaly and other congenital abnormalities, born of mothers who, during pregnancy, had received deep X-ray therapy to the abdominal region. This type of defect is becoming extremely rare, since pregnancy tests are made routinely before irradiating a woman in a childbearing age.

A type of mental defect which may be considered toxic in origin is the condition caused by blood incompatibility between mother and child. The best-known incompatibility is that due to the Rh factor. This factor is present in about 85 per cent and absent in 15 per cent of the general population. In a mother possessing no Rh factor (Rh negative) who carries a fetus possessing the factor (Rh positive), toxic substances are produced which upon reaching the fetus may cause damage to the blood, the liver, and the brain of the developing fetus. However, only 5 per cent of Rh-positive children from Rh-negative mothers develop the disease, and of these, some recover completely; so this incompatibility is responsible for less than 1 per cent of low grade spastic defectives. There is some evidence that incompatibility of the A or B blood factors, in rare cases, produces mental defect through a similar mechanism.

Mongolism, or mongoloid idiocy, is a common type of mental deficiency making up from 5 to 10 per cent of all defectives. It may be classified in the group of toxic mental defect, although little if any evidence exists about the nature of the toxic agents responsible for the disease.

The etiological factors responsible for the disease are little understood. It is maintained that the condition appears in the fetus before the third month of pregnancy, as a consequence of a variety of toxic conditions inherent in the mother and associated with advanced

age, endocrine disorders, or pathological lesions of the uterus.

ENDOCRINE DISORDERS

The frequency of manifestations of endocrine dysfunction in mentally defective individuals is high, probably from 10 to 20 per cent. However, only in a much smaller percentage can a direct etiological relationship be established between the mental defect and the endocrine disorder.

Hypothyroid mental defect, or cretinism, is the best-known type of mental deficiency due to endocrine disorder. Impaired function of the thyroid gland, whether because of lack of development or because of early destruction, is the cause of the disease. Cretinism occurs in endemic or sporadic form. The former is localized to some geographic areas where goiter is also prevalent, and affects groups of people. Hypopituitary mental defect is caused by dysfunction of the pituitary gland. The best-known type is the Fröhlich's syndrome, characterized by obesity, lack of development of genitalia, and mild mental defect.

EMOTIONAL FACTORS OR DEPRIVATION

The importance of emotional factors in the development of intelligence is brought out dramatically in a disease of children called "infantile autism." These children behave almost as idiots, do not talk, do not respond to stimuli, and fail to engage in any intelligent activity. Yet, psychiatric examination shows that most of these manifestations are due to withdrawal and emotional block. Intelligence is normal and often better than average.

This extreme degree of emotional interference with intellectual functioning is rare, but minor degrees are commonly

observed. Emotional deprivation, frustrations, and insecurity may result in emotional blocking, with consequent apparent mental defect ("pseudo feeble-mindedness") which responds to psychiatric treatment. Furthermore, a certain emotional impact on the defective individual is often observed, particularly in the high grade, physically handicapped patient, conducive to incorrect estimate of intellectual abilities. These facts emphasize the need for a complete psychiatric study of each mental defective.

Deprivation of means of learning is an obvious external factor resulting in apparent mental defect. Extreme degrees of deprivation, as exemplified in the classical case of Kaspar Hauser, are not likely to occur in our present civilization; but in isolated communities, deprivation of cultural stimulation in the educational environment still plays a role in the apparently low mental level of many individuals. Of greater practical importance is the deprivation observed in patients with special disabilities interfering with academic learning. Defective hearing, reading disabilities, word deafness, minor motor handicaps, and other elusive disabilities are responsible for a certain number of false diagnoses of feeble-mindedness. In these children, emotional factors are obviously intermingled with deprivation, contributing their part to the apparent intellectual defect.

TREATMENT AND CARE

Treatment in a strict medical sense can be applied to only a small number of defectives. Some cases of exogenous mental deficiency may respond to specific treatment: the cretin, if given thyroid early in life and for long periods of time, will improve considerably in his intellectual abilities; the hemiplegic defective may show considerable increase of I.Q. following surgical removal of

part of his diseased cerebral hemisphere. With the improvement of medical knowledge concerning the causes of mental deficiency, better methods of specific treatment are to be expected. It should be noted, however, that in the majority of cases, mental defect is the end result of a pathological process, whether genetic or exogenous, which took place and spent itself usually a long time before the defective came to medical attention.

Care of the defectives is directed toward providing protection for themselves and for others, developing and training residual faculties, and helping in the socialization of the defective individual. Protection for the defective is required particularly in cases of low grade defect and is best afforded in special institutions under careful medical supervision. Care of the defective for the protection of others comes into question only for the high grade defective. That anti-social trends may develop in the defective is too well known to need re-emphasis. The British Mental Deficiency Act of 1927 includes the category of "moral deficiency" for those individuals "in whose case there exists mental defectiveness coupled with strongly vicious and criminal propensities and who require care, supervision and control for the protection of others."

It is doubtful, however, that cases of psychopathic personality are more common among defectives than among intelligent individuals. Many instances of antisocial actions committed by defectives result from the fact that the defective is easily led. Many sexual aberrations in defectives are due simply to inability at concealment. Illegitimate pregnancies in defective girls often derive from lack of knowledge of contraceptive measures, rather than from abnormal lack of sexual inhibition. Moreover, behavior difficulties in de-

fectives are often the consequence of mismanagement by scholastic authorities; typical is the instance of the defective who becomes truant because of inability to cope with the intellectual demands of the teacher.

Probably the best solution for the treatment and care of defective delinquents consists in the creation of separate establishments independent of both criminal institutions and schools for defectives.

The second goal of care of the defective is directed toward developing and training residual abilities. In the lower grades of deficiency academic achievements are negligible, but habit training and teaching of simple tasks under supervision can achieve a great deal. In the high grade defective academic training may yield significant though unspectacular results. Vocational guidance directed toward developing special manual skills is an integral part of the educative program. Since institutional education provides for only one-tenth or less of the defective population, much responsibility falls to the family and the community. Yet community provisions for training of the defective have been slow in developing and usually inadequate. Among the attempted solutions are special classes in public schools, agricultural colonies under public welfare supervision, boarding-home family care, and sheltered shops. Each provision deserves extensive trial.

Scholastic and vocational training must be subordinated to socialization of the defective. Most high grade defectives are friendly, and adjust easily to social life provided the social environment is not hostile and the pressure and demands put upon them are not too great. To develop in these patients a feeling of social usefulness and responsibility, however limited, is essential.

The prerequisite of adequate treat-

ment and care is accurate diagnosis and complete medical, psychological, and psychiatric evaluation of the single case. Agencies or centers where adequate facilities for such diagnosis might be available are unfortunately few.

PREVENTION AND CONTROL

Adequate prevention depends upon exact knowledge of the causes of each type of mental deficiency. In the exogenous group much has been accomplished for the postinfectious type. Syphilitic mental deficiency, for instance, has considerably decreased since the advent of compulsory blood Wassermann tests in pregnant women. Better obstetrical care has reduced the incidence of severe traumatic mental defect. Toxic mental deficiency such as the type due to lead intoxication has almost disappeared. It is likely that in the near future each new discovery in medical sciences will produce important advances in the field of prevention of exogenous forms.

Major difficulties are inherent in the prevention of the endogenous forms. In the case of a single dominant gene, sterilization of the affected individual appears justified on biological grounds and would prevent transmission of the disease. However, since the expressivity of the gene is often irregular, recognition of the affected individual is not always a simple task. Moreover, fresh mutations will produce continuously new affected individuals.

In the case of a single recessive gene, sterilization of the heterozygous individuals would be biologically unjustified and practically impossible. Some limited measures of prevention may be obtained by discouraging parents of affected children from further parenthood and by avoiding consanguineous marriage.

Prevention of the undifferentiated form of mental deficiency in which multiple genes play a determinant role should be based on the justifiable assumption that these defectives should not marry among themselves and should not bear children. It is a matter of fact that, for obvious reasons, assortative mating is common among high grade defectives and that fertility is often high. Segregation of defectives in institutions during the reproductive period is a common and efficient method of prevention, but the financial burden to the community and the infringement upon the liberty of the defective individual hinder its general application. Sterilization, either voluntary or compulsory, seems to be at present the most adequate biological method for the prevention of this type of mental deficiency.

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