

PRESIDENTIAL ADDRESS

BIOLOGICAL ASPECTS OF THE Milder FORMS OF MENTAL SUBNORMALITY

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When one is honoured by the invitation to give an official address, and like myself has had the opportunity through the hazards of survival, change of country and frequent change of working place, to watch the long-term development of psychiatry one is glad to discuss mental deficiency problems, if only for their apparent simplicity. Other topics like schizophrenia, neurosis, epilepsy, senility, all allow for so many approaches and comprise such variegated symptoms and interpretations that a speaker has difficulty in selecting what he can cover in one lecture.

But is this really so much easier in the field of subnormality just because the symptom seems circumscribed and defined? As long as we can agree on a definition of intelligence, the symptomatology at least remains easy. But can we agree, when the tests of intelligence depend on cultures, or on civilisation? Their value has been much debated recently. One may argue that the tests are also influenced by evolution and biological adaptation, and insist that the various definitions should be reduced to the "power of thinking used for adapting to life." Here again the requirements of life vary, and in Western culture there are considerable differences today between the nihilism and despair of European philosophers, and the progressive optimism of Americans. Where there is little or no schooling, as in present-day India, testing may be very difficult; but the subnormal person will be recognised as a failure the moment there are competitive requirements in work or behaviour. With industrialisation of trades, as well as mechanisation of agriculture, the adaptive difficulties of the moron come to light.

I turn now to a basic fact which deserves first attention in any discussion of the biology of mental defect today. Recent medical developments in successfully combating infections are helping not only the survival of idiots and low-grade defectives — the number of mongols aged ten has increased fourfold in the last thirty years — but also of the feeble-minded who before, by their carelessness, smaller physical size and strength, and reduced resistance were easy victims of all the ills causing death in infancy. Not only do lower grade mental defectives have an extended life-span, but higher grade patients, who are the great majority, reach maturity and middle age in larger numbers.

The size of the M.D. problem, thus getting bigger, and its social implications, have been under-estimated for a long time, and in most places. It is rather typical that a country like Scotland, with a proud tradition of progressive care for the mentally afflicted, has very inadequate schools and hospitals for subnormal patients; and that Ireland which until recently had the most advanced law of commitment and related legal developments, has almost no mental deficiency institutions. I learn that a Commission of the Eire Government is in the process of being formed to deal with this administrative backwardness.

Sir Aubrey Lewis, speaking to an American audience in May of this year, contrasted the present flaring up of research interest in mental deficiency, with the previous neglect, which is still reflected in the difficulty of recruiting doctors for work in this field. When about thirty years ago I came from the European Continent, where the care and treatment of defectives was largely left to charitable

bodies, religious orders, and "teachers," who called in a general practitioner in emergencies once a month, I found the large institutions such as the Fountain and Caterham in this country remarkably progressive. I equally admired the legal provisions separating mental illness from mental defect, the link-up of the M.D. Acts with the educational regulations, and regarded this as steps in the right direction. Even the diploma of the R.M.P.A., separating mental deficiency from psychological medicine, impressed me as a sign of the recognition of the numerical importance of these subnormals, if of nothing else. As in any other field of medicine differentiation and specialisation seemed to me a sign of progress in psychiatry.

The pioneer work of Dr. E. O. Lewis based on a series of official bodies, and especially on the findings of the Wood Committee, had resulted in a large scale investigation, and produced **statistics of prevalence** without equivalent in any other field of psychiatry or in any other country. I hope I may be forgiven for recording such recent history, but it seems to me most striking that Lewis not only established the total prevalence, but also the difference between the sexes, and between rural and urban populations. Whatever one may think of his explanatory theories, this work remains a milestone in M.D. research.

It has been called paradoxical that we have learned more about the **genetics** of mental deficiency from the investigations of psychologists, especially of the **Spearman School**, than from the work of medical geneticists or psychiatrists. It seems natural that the latter have concentrated too much on severe cases with an obvious pathology, and have taken too little account of the much more numerous milder cases, especially of the dull and backward. Cyril Burt and many others have measured the intelligence of random samples of school children by tests, and have found variations along a continuous scale, the frequencies of the intelligence quotients forming a humpbacked curve representing a normal distribution of adaptive qualities. The distinction between the normal and the defective is thus not one of kind, but of degree. Everybody familiar with the topic knows of the important working hypothesis built up on these findings; it leaves entirely open the question of the causes of the individual variations, whether genetically or environmentally determined. And environmental influences, satisfactory home life, the example and stimulus from brothers and sisters, education, nutrition in childhood, etc.—may all have some influence on the intelligence of the growing child. The idea that defect could be inherited as a single character, present or absent, considered under Mendelian rules of inheritance has not proved fruitful. The genetical factor has to be thought of as due to **genes of small effect**, as they are generally recognised in biology. The degree of resemblance between the native ability of close relatives, of parents and children, brothers and sisters, and finally the congruity in intelligence between uniovalar twins make it clear, however, that **genetical equipment** has an important share in determining human variation in intelligence.

From these findings Dr. Fraser Roberts developed in 1940 a general theory of the genetics of intelligence and of its influence on mental deficiency. From a large scale investigation of school children he showed that **multifactorial genes** account for the normal variation and distribution, "the host of normal genes especially engaged in their task of guiding the normal human being along his normal developmental path." Feeble-minded persons are, therefore, only to be regarded as abnormal against the background of a complex civilisation. Imbeciles and idiots on the other hand are abnormal in a different and more fundamental sense. Phenylketonuria and amaurotic idiocy are obviously due to **single genes of large effect**; they are much rarer, and many of the genes may be of only occasional expression.

At the time of its formulation this theory seemed to fit all observed facts; since then many new facts have been discovered, and old observations have found new in-

terpretation. The distinction between sub-cultural mental deficiency due to multifactorial genes, and the severer forms with a more established pathology due to single genes is perhaps no longer true.

This distinction has in somewhat disguised form been accepted in the **new Mental Health Act**, which discriminates between subnormality and severe subnormality. As this Act, especially in its mental deficiency section, deviates deliberately from the scientific usage of words, trying to be ahead of our knowledge instead of codifying what has been established, one must feel uneasy at its division of defectives into two categories.

First doubts of the validity of the division come from the observation of **families with phenylketonuria**. Although this represents a severe, pathologically well defined, condition of mental defect, with an established Mendelian inheritance, in one of the families observed by Professor Squire in Birmingham a boy was found with the full metabolic disturbance, but with very little retardation of intelligence. Furthermore the appearance of most phenylketonuria patients, their facial expression, posture, and movements betray little or nothing of the cerebral metabolic abnormality, and of their mental standstill. In other words here is a defect of the rarer type, certainly not a normal variant, probably due to inherited metabolic abnormality. The affected children do not display any of the characteristics one would expect in such a severe inherited illness; they could be easily considered sub-cultural — if the findings in the urine did not tell otherwise.

At least five distinct metabolic abnormalities of a related kind have been detected lately; many of them display a more or less severe degree of mental backwardness. These are mostly so far single cases, but the hunt for metabolic disturbances among severer or milder form of backwardness may very well be successful, especially when we know about the biochemistry of the developing brain. On the other hand, if as Passamanik and Knobloch assume, metabolic disturbances connected with the circumstances of pregnancy and birth may have serious repercussions on cerebral development and function, we may find more of such cases among those hitherto considered sub-cultural. The disturbance may be purely environmental, or, more probably, the cases may be predisposed through special genetically controlled sensibilities of the central nervous system.

While the genetic nature of metabolic abnormalities may sometimes be uncertain, there is no doubt of this kind in the case of the extra chromosome which is the hallmark of the **mongol**. Mongolism is today the model example of severe sub-normality, with a pathology of genetic origin. This aetiological answer only achieved quite recently, to an age old problem poses a number of new questions to the research worker. One of them is why this chromosomal abnormality present in all somatic cells should impair intelligence first and foremost? It seems remarkable how many other chromosomal abnormalities, such as those of the Klinefelter and Turner syndroms recently described — are without backwardness or intellectual impairment. Time has been too short for critical insight into the reliability of the methods used in modern chromosome studies; but one would not be astonished if here again our formerly helpful distinction between two types of subnormality loses its heuristic value, and like all good hypotheses, crumbles away when its time has come.

There is little doubt that the third new aetiological category of the last decades, the effect of **maternal virus infection** on foetal development, has no genetic implications, nor have encephalitis or traumatic incidents in foetal life. These biological factors have by no means been exhausted in their nosological and preventive significance.

Much as I realise and appreciate the effort and collaboration of our psychologist colleagues in the understanding and socialisation of the defective of all grades, the combination of mental backwardness with all kinds of physical abnormal findings, metabolic, endocrine, cardiac and especially neurological, calls for the medical investigator. We need young, keen research-minded specialists in our field. All over the world paediatricians rally round defective children, and devote themselves to their biochemical study. Whoever saw the great numbers of eager educationalists, cultural anthropologists, psychologists, and biochemists which formed the public at the recent International Congress in London, will understand my wish for medical and psychiatric enthusiasm and recruitment.

Summing up I have tried to put before you on this occasion the following points : **Firstly** an appreciation of the role of England and English workers in the study and treatment of mental deficiency in the recent past; **secondly** the distinction of sub-cultural from pathological cases of mental deficiency, and the genetical basis of this theory; **thirdly** the reasons for doubting its value and fertility today by pointing to the metabolic, chromosomal, and infective aetiological findings; and **fourthly** a plea for more medical research and medical research workers.

References

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