HEREDITY A MINOR FACTOR IN MENTAL DEFICIENCY

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The subject of mental deficiency has been brought to the notice of the medical profession and of the public by the recent report of the Departmental Committee on Sterilization.* Although the popular opinion of mental deficiency is that it is one disease and is inherited, it has long been recognized by medical men that a number of clinical types go to make up the aggregate of cases in the population. An important question raised by the report is the distribution of hereditary and non-hereditary cases in this aggregate. This question can only be answered by the investigation of a large number of cases; and these cases must be not only a large but a representative sample of the condition as it occurs in the general population. Such investigations have been made and are being made in institutions for mental defectives; but the criticism had been made of these institutional statistics that cases regarded as hereditary tend to be concentrated there, and that they do not form a good sample. A better sample would be one drawn from all classes of the population, and dealing with cases at an earlier age than those in institutions.

Dr. John Thomson's Analysis

The late Dr. John Thomson published in 1924 an analysis of 952 cases of mental deficiency¹; and all of these were under 5 years of age at their first examination. They were drawn from his private practice and from a special hospital clinic, which he established in 1904 for the clinical study of these cases; and they were based upon a total of about 1,200 cases, the remainder of which were over 5 years, and were excluded from his analysis. Here we seem to have a really good sample of mental deficiency as it occurs in the general population in early childhood—an investigation of a very large number of cases by one man, expert in this subject, and recognized as an accurate clinician, his study extending over twenty years and following up many of the cases for years. This investigation is the largest and best of its kind that has been carried out in this country. It is, and will probably long remain, the classical clinical study of mental deficiency. It seems to have been overlooked, and it is appropriate to call attention to it at the present time, and to make some comments.

Dr. Thomson divided his total into nineteen clinical groups, arranged in the two larger groups of primary and secondary amentia according to Tredgold's classification. In a paper which I published some years later² I arranged his clinical groups (without any alteration of the groups themselves) under the classification of ante-natal, natal, and post-natal, for reasons that will appear presently; and I also added forty-eight cases, taken consecutively from his hospital records between the publication of his paper and his death in 1926, in order to bring the total up to 1,000. This analysis of 1,000 cases is shown in Table I.

This classification of the cases shows that 65 per cent. were ante-natal in origin (and this figure should be a little higher, as some of the hydrocephalus group must have arisen in the ante-natal period), while 20 per cent. were natal, and due to trauma and vascular lesions of the brain at birth. Thus 85 per cent. of the cases were congenital, while 15 per cent were post-natal. It shows also the large number of known pathological conditions that cause mental deficiency.

TABLE I.—*Mental Deficiency. 1,000 Cases under 5 years*
(John Thomson)

Ante-natal	Natal	Post-natal
Simple primary amentia ... 292	Spastic diplegia, from birth injury 89	Hydrocephalus and meningocele ... 58
Mongolism ... 246	Spastic diplegia, with doubtful birth injury ... 28	Epilepsy ... 44
Microcephalus ... 25	Spastic diplegia, with no birth injury ... 34	Hemiplegia ... 16
Congenital syphilis 29	Birth injury, without spastic diplegia ... 47	Following cerebro-spinal meningitis 12
Sporadic cretinism 46		Encephalitis lethargica ... 4
Tuberous sclerosis 3		Hypopituitary ... 2
Various ... 4		Various ... 17
Amaurotic family idiocy ... 4		
Total ... 649	Total ... 198	Total ... 153

HEREDITARY AND NON-HEREDITARY CASES

Although Dr. Thomson himself made no attempt to divide the cases into those that are hereditary and non-hereditary, an attempt at such a grouping may be made. Taking the non-hereditary group first, the natal and post-natal cases can be put into it: and of the ante-natal group, the cretins and syphilitics also belong to it. I propose to add also to it the large total of 246 mongols, for the following reasons. The cause of mongolism is unknown; it may be due to some fault in the developing embryo, or to some condition of the uterus, or even to some defect in the germ. Even if it were shown to be a genetic defect, it is accidental and not essential, and is not hereditary. The mongol leaves no heirs; and his parents, his brothers and sisters are not more liable to beget mongols than other people. This inclusion of mongols in the non-hereditary group is already done in American statistics.

Let us now deal with the hereditary group. The four cases of amaurotic family idiocy certainly belong to it: the hereditary mechanism is here beyond dispute, and is recessive Mendelian. There only remain the very large group of simple primary amentia, and a much smaller one, microcephalus. In these two groups heredity is believed to play an important part by most of those who have made a special study of the subject; but the hereditary factor is obscure, has not been convincingly demonstrated, and is still a matter of dispute. Meantime we may class these last two groups as uncertain; and so rearrange the total on a hereditary basis as follows:

TABLE II.—*Mental Deficiency. 1,000 Cases under 5 years*
(John Thomson)

Hereditary	Doubtful Hereditary	Non-hereditary
Amaurotic family idiocy ... 4	Simple primary amentia ... 292	Ante-natal. Cretinism 46
	Microcephalus ... 25	Ante-natal. Syphilis 29
	Various ... 4	Ante-natal. Mongolian ... 246
		Ante-natal. Tuberous sclerosis ... 3
		Natal (total) ... 198
		Post-natal (total) ... 153
Total ... 4	Total ... 321	Total ... 675

Thus in a large number of cases, a sample representative of all types of mental defect and of all classes of the population, heredity in the sense of transmissible defect or disease plays no part in a large majority of the cases (two-thirds); it is believed to play some part, obscure and uncertain, in one-third; and its action is definite and certain in only a negligible fraction of the whole.

Let us now examine the middle division of Table II, where the influence of heredity is obscure. It is made

* See *British Medical Journal*, January 27th, 1934, p. 161.

up to a great extent by the simple primary amentia group. This is not a homogeneous group of one clinical type, it is a residue of cases, which cannot be placed in any of the other groups, but which otherwise differ both in their bodily condition and in their mental behaviour. But it is a large group, the largest of all, numbering in this series nearly a third of the total; and in it the mental defect is ante-natal, so that it must be due, either to some morbid process after conception, or to genetic defect or weakness. As no morbid intrauterine process has been discovered, it is natural to suspect a hereditary taint in all or in a great majority of the cases in this group; and especially as among them we have the degenerate class, where one or both of the parents are defective both in mind and in body, and tend to beget defective children.

In this degenerate group the action of bad heredity is certain; yet it is not the transmission of a Mendelian defect, but that general blend of the constitution of the parents in the child which is the universal hybrid inheritance of man. Further, it must be remembered that the morbid factors of environment are also specially active in this group. It would be a serious mistake to ignore the importance of this group; they put a heavy social burden upon the community, and everyone would welcome measures to reduce their numbers. It is agreed, however, that in institutions the group of degenerate defectives form only a small minority, and that the great majority of the simple primary aments there have parents who are normal in mind. My own experience of simple primary amentia is based upon a large number of cases seen both in hospital and in private practice, which may be taken as a fair sample of this type of defect as it is found in the general population. In the overwhelming majority of cases the parents have been men and women of average or superior intelligence, character, and general health. If these cases are hereditary, what, then, is the nature of the hereditary mechanism? If they are due to the transmission of a recessive Mendelian defect, we ought to find the same types of amentia cropping up in successive generations of these families. Such a regular re-appearance of similar types has not been found in this country, although it is said that a type of recessive Mendelian feeble-mindedness exists in certain districts of Sweden. There remains the theory of a neuropathic constitution, which is not Mendelian inheritance of one fixed and recurrent defect, but an inherited liability to a group of morbid conditions, including mental defect, insanity, epilepsy, and nervous instability. It is not a satisfactory theory, and the evidence in support of it is not convincing; but in the absence of other evidence of ante-natal defect or disease it is widely held. But it is well to remember that congenital syphilis was regarded not so long ago as hereditary: it is now proved to be an ante-natal infection. Sporadic cretinism also was once hidden in the general mass of inherited mental defect, and is now a classical example of an ante-natal endocrine defect. It is reasonable to believe that further clinical investigation of this miscellaneous group of ante-natal mental defects, labelled simple primary amentia, will extricate from it other types of ante-natal disease and defect, and that these, when recognized, may be cured like syphilis and cretinism, or prevented. Heredity does play a part in the production of cases of simple primary amentia; whether that part is large or small we do not know. It is a reasonable assumption that morbid conditions of intrauterine environment are also playing a part. In our present state of ignorance the question of the respective parts played by hereditary and non-hereditary factors in the production of cases of simple primary amentia is unsettled and uncertain; and no dogmatic statements are warranted.

NEED FOR AN AUTHORITATIVE STATEMENT

For some years past active public propaganda has been carried on, by which our people have been led to believe that mental defect is nearly always inherited. They are told that at least 80 per cent. of all cases are accounted

for in this way. It is very desirable that some authoritative statement should be made in the medical press at the present time, showing how this percentage figure has been obtained, and giving some details of the actual investigations, with the numbers of cases and the methods employed.

Meantime, it is common ground with us all that the great majority of the parents of mentally defective children are men and women of average or more than average intelligence and character. I have had a fairly long and extensive experience of the mentally defective child and its mother at the Edinburgh Hospital Clinic, and I have been convinced of two things: the mother of the child is above rather than below the average in intelligence; and in her devotion to the child, and in the courage and cheerfulness with which she faces her heavy task, she shows the highest moral qualities. She might well be spared the additional pain and humiliation caused by all the popular lecturing and preaching on mental defectives. The appearance and behaviour of mentally defective persons, both children and adolescents, create, and naturally enough, a feeling of repugnance and disgust in the mind of the ordinary man; they seem to be less than human. But they are the same human clay as ourselves, only marred somehow in the making.

CONCLUSIONS FROM THIS STUDY

Finally, some general statements may be made, based upon this study of 1,000 cases of mental deficiency, constituting a large and representative sample of the condition as it occurs in the population, and carried out by a physician whose experience of the subject was very extensive, and whose reputation for clinical accuracy was very high.

The great majority of the cases were congenital (85 per cent.), and a large majority were ante-natal in origin (65 per cent.).

A large majority (two-thirds) were the result of non-hereditary morbid processes, acting before, during, and after birth.

In only a small fraction (0.4 per cent.) was mental defect known to be produced by the mechanism of Mendelian inheritance.

In a larger group (one-third of the aggregate), an important influence of heredity may be accepted for those cases where the children were born of defective parents. These cases, however, form only a small minority of this group. In the great majority, where the parents were of normal mind, the influence of heredity was uncertain and obscure.

The general conclusion appears to be that heredity plays a very small part in the production of congenital mental deficiency, and that its influence in this respect has been very greatly exaggerated.

REFERENCES

- ¹ Thomson, John: *Edin. Med. Journ.*, May, 1924.
- ² McNeil, Charles: *Ibid.*, October, 1931.

We have received from the secretary of the Birmingham Hospitals Centre, Captain J. E. Stone, a copy of the first number of *The Samaritan*, a quarterly journal published by the Birmingham Hospitals Contributory Association. This includes messages of encouragement from the Lord Mayor (Alderman H. E. Goodby) and the Lady Mayoress, and the chairman of the Committee of Management, Colonel Bertram Ford. The Lord Mayor writes: "Birmingham is proud in the knowledge that the hospitals contributory organization, as formed in this city, has served as a model and incentive for the rest of the country." The Lady Mayoress refers to the splendidly equipped ambulance service, which, with the co-operation of the St. John Ambulance workers, has done such efficient work during the last few years. An article on the Birmingham General Hospital is contributed by Mr. A. H. Leaney, the house governor.