may be utilized with advantage; the patient with Parkinsonism who has difficulty in getting off to sleep may well take 50–150 mg. (i.e., 1–3 capsules) on retiring. Another popular preparation is phenindamine ("thephorin") given in doses of 100 to 200 mg. either alone or preferably combined with benzhexol (8–10 mg. daily) or procyclidine (5–15 mg. daily). Thenindamine is marketed in 25-mg. tablets.

Psychiatric Symptoms

Although the phenomenon is quite rare, some patients unfortunately develop flamboyant psychiatric symptoms when taking these post-war remedies. In such cases it seems as though switching from one preparation to another does not meet the situation, and these types of drug simply have to be withheld altogether.

These unusual symptoms comprise in the first place a gradually mounting degree of confusion—of which the patient, incidentally, is fully aware. Then develop ideas of reference, at first regarded by the patient as foolish, but gradually increasing in plausibility. Next come vivid fantasies both in the sleeping and the waking states. Lastly an actual hallucinosis supervenes, with visions of imaginary animals and people, usually of a bizarre and even horrific nature. Tactile and auditory hallucinations are less common. Nothing short of complete abstinence from drug therapy is effective, and the patient regains intellectual normality only at the cost of enhanced physical disability.

Solanaceous Drugs

Finally, it is worth bearing in mind the older, that is pre-war, remedies which used to help patients with Parkinsonism. They still deserve a place within our armamentarium not only for those cases in which the newer drugs are badly tolerated, but also as an adjuvant. In other words, combinations of the antispasmodics with the solanaceous drugs may prove to be quite useful. Of the latter drugs, hyoscine hydrobromide was the one most often used. It was generally prescribed in initial doses of 1/150 gr. (0.4 mg.) thrice daily, often in a mixture to which potassium bromide 5–10 gr. (0.3–0.65 g.) and tincture of nux vomica 10 minims (0.6 ml.) were added. Sometimes it was prescribed in the form of a tabella which was allowed to dissolve under the tongue.

Atropine or belladonna were also given. Patients with the post-encephalitic types of Parkinsonism seemed to respond better than cases of paralysis agitans—but that, of course, is the common experience and applies to all forms of drug therapy. Those patients who are particularly incommoded by excessive salivation are often helped most by atropine or belladonna. Large doses are needed, and it is difficult to avoid such complicating symptoms as blurred vision, palpitations, and nausea. When employing belladonna it is worth remembering that, while young patients tolerate this drug well, some are naturally sensitive to it. In these cases the side-effects may be so distressing as to preclude the drug, and the major complications include psychiatric states of confusion and mild delirium.

Formerly some attention was paid to what was called the Kleeman treatment. At times it was beneficial and it may still have a small place in the modern therapy of Parkinsonism. The object here was to give the patient rapidly increasing amounts of atropine so as to condition the patient to comparatively high doses. Kleeman would begin with 0.5 mg. of atropine daily in the form of a ½% solution of atropine sulphate given in two doses (one drop containing 0.25 mg.). This is increased by 0.5 mg. daily, spread over three doses, so long as any clinical improvement is produced. Thereafter the dose is gradually reduced in order to determine the optimal amount. Kleeman found this to be as a rule 3 to 7 mg. of atropine daily (though some other physicians used even higher doses).

There were several useful and "elegant" preparations on the market which were often of great service in the treatment of Parkinsonism. They were relatively mild in effect, and, being largely devoid of complications, could be prescribed with considerable latitude. Some of these preparations combined in pilule or tablet form small amounts of hyoscine, atropine, and hyoscyamine.

Lastly, stramonium was a most useful palliative treatment, especially in the post-encephalitic varieties of the disease. By shrewd prescribing, it was possible gradually to increase the dosage and to attain comparatively high and clinically effectual amounts. Though the tincture of stramonium was often prescribed—doses starting at 10 minims (0.6 ml.)—experience showed that the dried extract of the drug (ext. stramonii sicc., *U.S.P.*) was the most effective. Here the initial dosage was ordinarily 0.25 g. three times a day. The side-effects of stramonium resemble those of atropine, but they were less common and milder.

A. F. Hurst, who never shrank from prescribing drugs in high dosages, used to advocate the giving of large amounts of stramonium, by dint of gradual augmentation coupled with the administration of pilocarpine. Treatment would begin by the patient taking 10 minims (0.6 ml.) of tinct. stramonii in ½ fl. oz. (14 ml.) of water on waking, after lunch, and after tea. If stiffness interfered with sleep, a fourth dose was given to the patient as he retired. On alternate days 1 drachm (3.5 ml.) would be added to each dose, so that in eight days the dose would be doubled. This gradual increase would go on until the patient complained of blurred vision or undue dryness of the mouth. Pilocarpine nitrate, 1/10 gr. (6.5 mg.), would then be added to the latest dose of stramonium, and once more the increase of 1 drachm (3.5 ml.) on alternate days would go on, until slight toxic symptoms developed.

EARLY DISTURBANCE OF BEHAVIOUR IN RELATION TO MENTAL DEFECT*

BY

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In the majority of cases of mental defect there are no specific or qualitatively distinct forms of behaviour which could be the basis for early recognition of abnormality. In most instances there exist merely quantitative changes; the behaviour of the child has not reached the level of development which might be expected in view of the chronological age.

Value of Early Assessment

I would like first to ask what is the purpose of the medical adviser in attempting to make an early diagnosis of mental defect and, indeed, to question whether such attempts are always wholly praiseworthy. For practical purposes it is possible to distinguish between two levels of mental defect, high grade and low grade. The former term covers the feeble-minded; the legal validity of this term as at present used has been called into question, and there is some danger that it may be replaced by the even more elastic word "psychopath." The low-grade patients include the idiots and imbeciles, and for those who prefer some attempt at numerical estimation an intelligence quotient of 50 is usually taken as marking the borderline between the high- and low-grade groups.

In regard to adult mental defectives, more than half the population of institutions is made up of high-grade cases (O'Conner and Tizard, 1956). In the case of children, however, the position is quite different, since the Education Act of 1944 removed the necessity to

*Based on lecture to Assistant County Medical Officers, Essex, 1957.

certify as mentally defective children in need of special education. In considering the question of mental defect in young children, therefore, we are concerned only with low-grade cases—that is, with idiocy and imbecility. The school medical officer may, however, also be concerned with the question of educational retardation and the need for special education.

I understand that the position in the area with which I am here concerned is that special schools are not available for the educationally subnormal (E.S.N.) until they reach the age of 7 years. An adjacent local authority, on the other hand, has taken the step of providing a nursery school for the E.S.N. Let me say at once that there is a question of expediency here. From a practical point of view, and faced with pressure of social circumstances, it may be easier to help a supposedly backward child in areas where special facilities are provided from an early age. So far as principle is concerned, however, a decision regarding special schooling at the age of 7 years seems much more desirable. By that age it will have been found by experience what the child's capabilities in the way of learning really are, and some form of assessment of his probable future progress will be possible. It seems very undesirable that a child should be classed at the age of 2 or 3 years as E.S.N. or even occasionally as feeble-minded, since an analysis of the total situation in such cases will more often reveal a disturbed background than a disturbed child (Hilliard and Kirman, 1957). Adverse social factors play a major part in causing such cases to be considered retarded (Craib and Woodward, 1958 ; Kirman, 1958). It is particularly important to remember that once such a decision has been made the label tends to stick to the child throughout his subsequent career regardless of all provision for reassessment.

Anatomical Basis for Mental Defect

Tests are of value only if they predict subsequent attainment, and the predictive value of tests of ability under the age of 5 is limited (Vernon, 1955). If, therefore, we are attempting to assess in the case of a particular young child whether or not he is mentally defective on the basis of unusual behaviour it seems desirable to confine our attention to gross defect. It has long been considered that in most cases of gross mental defect there is a corresponding gross abnormality of the brain. Berry (1938) noted the marked reduction in weight and size. Recent work (Crome, 1954) on a big series of unselected cases has confirmed that obvious lesions are usually present. Figs. 1 to 5 illustrate some of the abnormalities observed. This being so, it will be found that in a considerable number of cases a detailed history and a careful physical examination will provide evidence of abnormality to supplement the story of abnormal behaviour. This applies equally to cases due primarily to genetic factors (primary amentia) and to those ascribed to environmental influences (secondary amentia). In a proportion of cases, however, the cerebral abnormality is discovered only after death, and during life there were no neurological symptoms and no history of illness or untoward event which might have produced the abnormality. In these cases the only symptoms of the cerebral defect are those which are summed up as "mental defect."

First Symptoms Noted By Parents

The data shown in the accompanying Table are derived from the social histories of 233 patients admitted to hospital, usually under the age of 5 years, as mental defectives. In each case the leading symptom complained of by the parents is taken. In some instances there was no specific complaint, merely a general statement that the child was slow in developing, but in the majority more specific information was available. The symptoms leading to the first recognition of the mental defect have been shown at the time at which they came to the notice of the parent. In

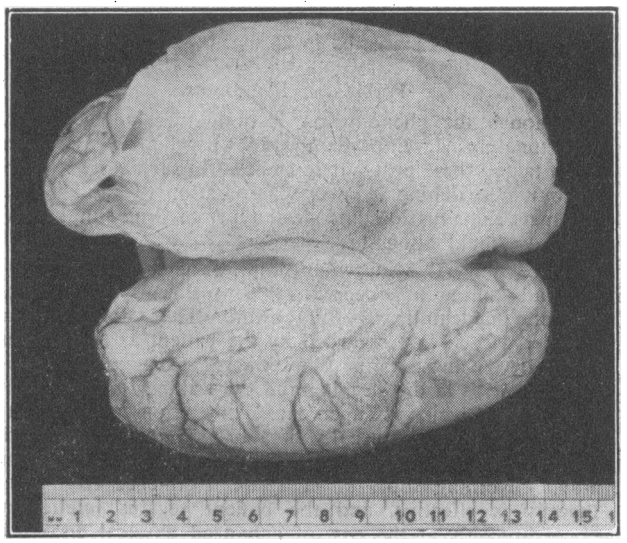

FIG. 1.—Hydrancephaly. Very little functioning brain cortex. Complaint of constant screaming and taking no notice at 3 months.

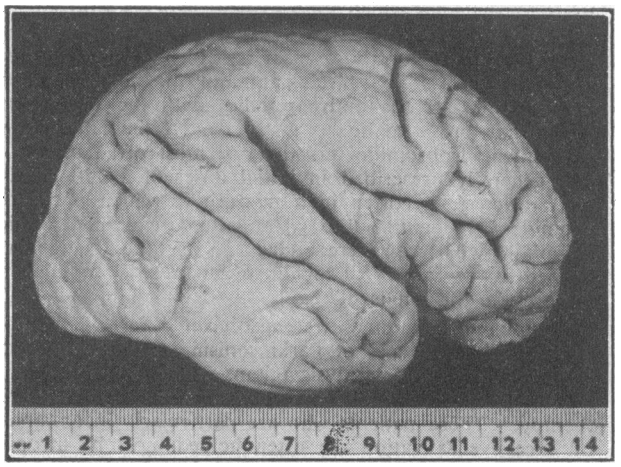

FIG. 2.—Pachygyria with very poor development of sulci. Convulsions at 3 months followed by regression.

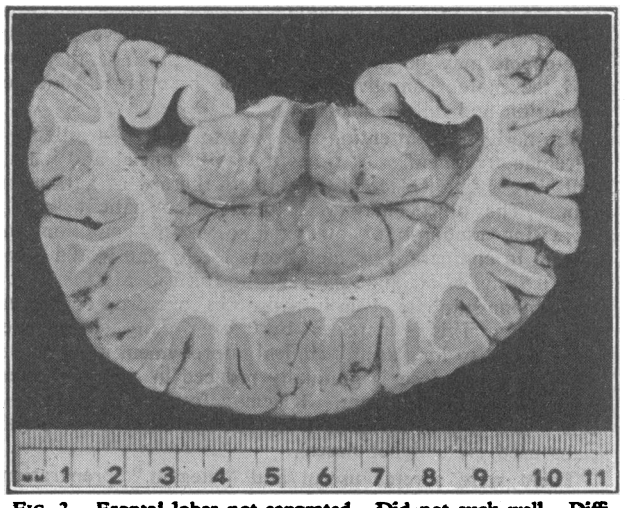

FIG. 3.—Frontal lobes not separated. Did not suck well. Difficult to feed from birth.

many cases this was when the parents first felt sure about the defect: they had often had a vague suspicion previously that all was not well. This was particularly so, for example, in the case of twins where the normal child was available for comparison. In many histories additional details have been supplied, but it was thought that a clearer picture would emerge if only the first symptoms which arrested the attention of the parent were recorded.

Table Showing Time of Appearance of First Symptoms of Mental Defect in 233 Children

Symptom	Age in Months							Total
	Birth	Under 3	3–5	6–11	12–23	24–35	36–48	
Physical features	25	18	8	5	4	1	—	61
Eye defect	4	5	9	5	4	2	—	29
Feeding difficulties	3	1	—	—	—	—	—	4
Quiet	—	2	—	—	1	—	—	3
Cerebral palsy	—	1	5	—	—	—	—	6
Slow	—	1	14	16	9	3	—	43
Not taking notice	—	1	6	1	—	—	—	8
Not sitting	—	—	14	15	5	—	—	34
Screaming	—	1	4	1	2	—	—	8
Peculiar movements	—	—	4	—	—	—	—	4
Not crawling	—	—	2	—	—	—	—	2
Not walking	—	—	—	1	10	5	—	16
Restless	—	—	—	1	3	1	—	5
Not using hands	—	—	—	1	—	—	—	1
Head banging	—	—	—	—	1	—	—	1
Not speaking	—	—	—	—	1	4	—	5
Not playing with toys	—	—	—	—	1	—	—	1
Destructive	—	—	—	—	—	1	—	1
Not clean	—	—	—	—	—	—	1	1

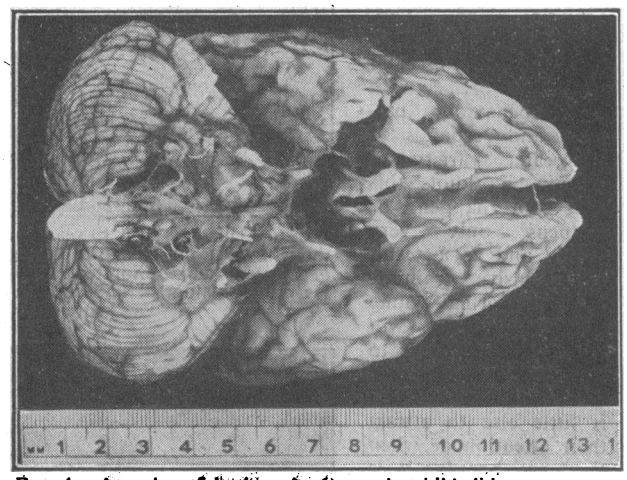

FIG. 4.—Atrophy of brain. At 6 months child did not seem to see or hear.

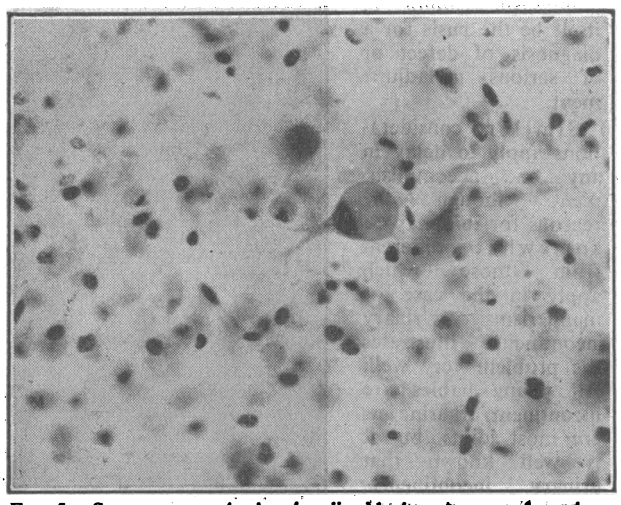

FIG. 5.—Same case as 4, showing lipoidosis. A case of cerebro-macular degeneration.

The biggest single group of cases was recognized by the parents or by their medical advisors on the basis of physical abnormalities, and this was also the group most readily recognized at birth, as might be expected, since the range of behaviour of the newborn baby is so limited. The commonest of the physical abnormalities recognized in this way was mongolism, but the group also includes such conditions as microcephaly and hydrocephalus. Another big group of cases was noticed early on account of "eye defect." Some of these children were blind, but more often they seemed blind to the parents at this early stage. Their eyes did not follow a light or they failed to fix objects with their eyes, or, slightly later, failed to turn their heads towards objects displayed. The groups which first came to attention because of feeding difficulties, quietness, or cerebral palsy were smaller, and the next big group is that merely classed as generally slow. This is obviously a residual collection due either to failure of the parent to particularize or simply to realization of the fact that this was indeed the most accurate description of the position, that the child was slow in all his accomplishments.

In the "not taking notice" group the emphasis is on the lack of emotional response, whilst the big "not sitting" group begin to worry the parents because of failure to reach this important and well-recognized "milestone" at the appropriate time. A smaller group of parents had suspended judgment until the child failed to walk at the normal time, and only five had delayed still further until the child had reached the appropriate time for beginning to talk. Five patients were noticeable because of restlessness and single cases because of other symptoms.

In glancing through the list of symptoms perhaps the most striking thing is that most of them are negative—that is, simply a statement that a child failed to do a certain thing at a certain time. Only 18 cases drew attention to themselves because they did something which was unusual. Perhaps a more correct statement would be that they persisted in doing something after the time for this form of activity had gone by; this applies, for example, to the fine repetitive movements of the fingers which are normal in a young baby but which are later described in imbeciles and idiots as "digital mannerisms." These patients with positive symptoms included the "screaming" group, those with "peculiar movements," restlessness, head banging, and destructiveness. The majority, then, exhibit simply a quantitative defect or retardation of behaviour development which may be given a quantitative expression on the basis of any of the recognized scales of norms.

Psychosis or Mental Defect?

Difficulties may arise in the interpretation of the abnormal behaviour noted in both the majority and the minority groups. For example, it is well known that on occasion a child who fails to sit, stand, or talk at the usual time may yet prove to be above average in intelligence. It is, however, the minority group whose leading abnormality consists of qualitatively abnormal behaviour who are most difficult to understand. On the one hand the symptoms may simply be evidence of retardation. This may be true of restlessness. Normal children are restless, but they are usually capable of being trained to some extent, so that the expression of the restless tendency can sometimes be limited by parental influence. This implies, however, capacity to respond to "atmosphere," to adult approval or disapproval, and to other factors in the social environment. Very backward children are slow in acquiring this capacity, and the abnormality is not so much that they are restless as that they are inappropriately and persistently restless in an unmodifiable manner.

On the other hand such symptoms as restlessness or "peculiar movements" are also characteristic of children with psychotic and neurotic illnesses. It is often a matter of extreme difficulty to distinguish between simple mental defect and psychosis in a young child. To some extent the distinction is one of definition. In any considerable group

of mentally defective children there is a small minority who might more aptly be described as psychotic. They function socially at idiot level and fail to co-operate in standard tests to such an extent as to secure a very low rating. On the other hand, careful observation may lead to an impression that the child has considerable capacities which are unused or are utilized in a negative manner. For example, a child who attracts attention by head banging may display other forms of negativistic behaviour. This behaviour may be nicely timed in such a manner as to indicate considerable discernment of social situations. The appearance of a stranger or any other slight derangement of the usual order of events may be followed by refusal of food or by a display of head banging. Obsessional tendencies in such patients may likewise indicate extreme nicety of perception.

The position is still further complicated by the fact that it is not rare for a backward child to develop superimposed psychotic features. Similarly, withdrawal and "autism" may be seen in children who are known to suffer from epilepsy or to have good evidence of structural abnormality of the brain.

It should also be pointed out that in psychotic children simple failure to carry out normal activities may also be a conspicuous part of the picture. The commonest form of infantile psychosis is of the schizophrenic type with poverty of social contact, and an important feature is often muteness, though such children may speak in complete sentences on exceptional occasions.

It follows that there are three possible interpretations of such abnormal features as head banging, restlessness, destructiveness, peculiar movements, and screaming. In the first place, any one of these symptoms taken alone may be merely a passing phase in the life of a child and may have no serious significance. It may represent a natural reaction to some set of unfavourable circumstances such as a sudden alteration in the amount of parental attention available. Secondly, these symptoms may be the manifestation of a profound abnormality of personality in a childhood psychosis. In the present connexion I am using the term psychosis to cover a serious prolonged mental illness in which there is no evidence of gross organic brain damage and in which there is an impression of retention of a potentially normal mental capacity: fortunately such conditions are relatively rare in young children. Finally, these symptoms are by no means uncommon as part of the picture of simple mental defect.

At this point I would like to emphasize something which may be thought obvious—this is, that backward children, like ordinary children, react to their environment, though at a more infantile level. If that environment is conducive to the development of emotional disturbances then they may well develop and complicate the picture of straightforward defect. An investigation by Dr. M. Woodward (in press) showed that there was a correlation, significant at beyond the 0.001 level, between disturbed behaviour after admission to a mental deficiency hospital and a mentally adverse home background prior to admission, using objective criteria.

In order to illustrate the vexed question of infantile psychosis and mental defect a film was recently prepared by Dr. E. J. Anthony, of the Institute of Psychiatry, including some studies of typical mannerisms and movements. Two photographs illustrating this subject are reproduced here (Figs. 6 and 7) showing the mannerisms commonly seen in idiocy. Mannerisms of this type are described in such conditions as phenylketonuria, but they are in no way specific to this condition and may be seen in idiocy due to any cause. It is also very difficult to differentiate such mannerisms from those which may be seen in psychotic children. The distinction must be made on the basis of the general picture rather than of the individual symptom. In idiocy the child has not advanced beyond the level of repetitive manipulation, whilst in psychosis he may regress to that level. A clear history of previous normality is sometimes valuable in making the distinction, but there are reservations to this. In a minority of cases severe defect, perhaps amounting to idiocy, develops after some cerebral catastrophe—for example, post-inoculation encephalopathy or status epilepticus from whatever cause.

Limited Significance of Individual Features

It is extremely hazardous to make any definite forecast on the basis of a single defect or abnormality in the behaviour of a child. The question of mannerisms may be used to illustrate this point. Persistent head rolling is such a mannerism, and may be seen quite frequently in both idiot and psychotic children. It is also, however, by no means uncommon in normal children. It may, at one stage in the development of an otherwise quite normal child, seem to be an essential preliminary to sleep, when it appears to serve a self-hypnotic role. In normal children these circular activities of very limited scope tend to be broken as the child develops more complicated behaviour patterns and responds to a greater variety of stimuli. In idiots this does not happen, or happens only very slowly and as a result of intensive training. As with normal young children, idiots will tend to resort to repetitive self-hypnotic behaviour when there is little else to attract their attention or when they are bored. It is clear, then, that the presence of such a mannerism cannot in itself be the basis for a diagnosis of defect or of serious maladjustment.

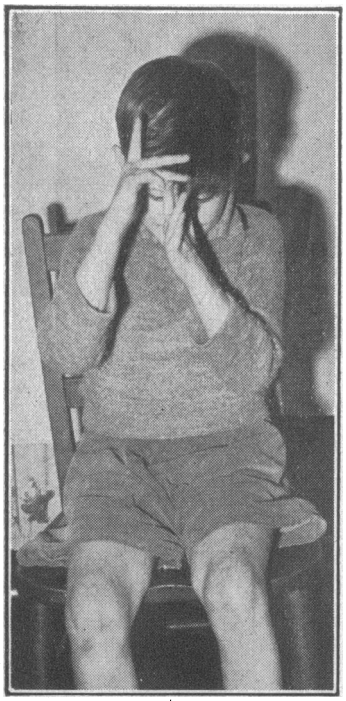

FIG. 6.—This boy aged 10 years was thought to be normal up to the age of 3½ years but deteriorated rapidly. He now functions at imbecile level. He shows a variety of mannerisms.

Similar considerations apply to delay in any one accomplishment, though the reasons for this may be somewhat different from those which apply in the case of mannerisms. Urinary incontinence illustrates the problem very well. All young babies are incontinent of urine, as are most idiots, but it is well known that urinary incontinence, especially nocturnal, may persist into adult

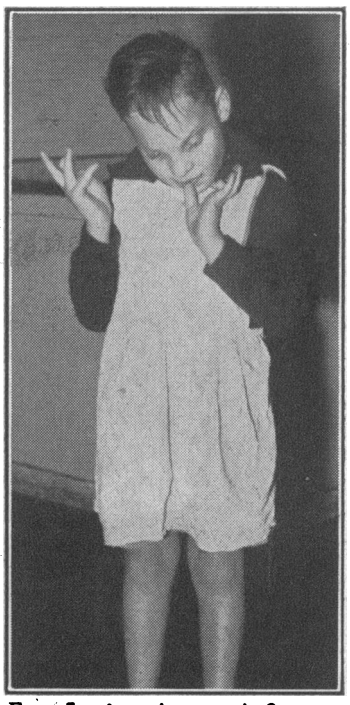

FIG. 7.—An idiot aged 8 years suffering from phenylketonuria.

life in a great variety of conditions apart from mental deficiency. A proportion of these cases are obviously neurotic in that they have other obvious features of neurosis, such as excessive anxiety, night terrors, shyness, timidity; others have some physical abnormality such as paraplegia to account for the weakness. In many children, however, this lack of sphincter control seems to be a solitary abnormality, and one is tempted to think in terms of delayed maturation of the apparatus responsible for the establishment of control. To base any far-reaching conclusions on the existence simply of urinary incontinence at, say, the age of 5 years is improper.

A word may also be said about the need for similar caution in interpreting normal behaviour in very young children. The older views about cerebral localization have come in for a good deal of criticism lately, and, while there is still a lack of general agreement on the subject, there is a tendency to a more dynamic concept of cerebral function which visualizes the central nervous system acting as a whole. None the less, it seems reasonable to suppose that activities such as breathing, coughing, and sucking, which are early developed, are more directly dependent on the integrity of the lower centres, while functions such as the use of logarithmic tables demand a certain amount of normal cortical tissue. The acquirement of skills such as sitting up independently and walking occupies an intermediate position. Most commonly, in severe mental defect the whole range of capabilities is affected in a fairly even manner. Even such elementary functions as coughing and swallowing may be seriously impaired, and breathing may be difficult to establish in a child with a severe brain abnormality. However, from time to time a case is encountered in which early development seems fairly normal in regard to the more vegetative functions and to early motor development. This may apply to children with a severe degree of tuberous sclerosis who may yet sit and walk at a normal time but prove eventually to be of idiot level. The most obvious explanation of this phenomenon would appear to be the fact that in severe mental defect there is a tendency for the higher centres to be more severely damaged than the lower. Similar considerations would apply to the case recently demonstrated by Professor Illingworth in which an infant with gross microcephaly passed the first "milestones" at the correct time.

A parallel with the phenomenon mentioned above may be found in cases of athetosis due to rhesus incompatibility. These children may seem fairly well after recovery from the acute illness (Crome *et al.*, 1955), and athetosis manifests itself only when the child reaches the stage of development at which co-ordinated purposeful movements are attempted.

Advantages and Disadvantages of Early Attention

I have avoided using the term "diagnosis" in this connexion, since mental defect is not a disease entity but rather a legal and social convention. As more light is thrown on the cause of deviation from the normal it becomes increasingly valuable to direct attention to young children who exhibit unusual or retarded behaviour. There is a small group of conditions which are amenable to direct treatment, such as cretinism, phenylketonuria, hypoglycaemia, galactosaemia. Some cases of petit mal associated with backwardness may also derive benefit from treatment. There is a whole group of children who are backward in certain respects whose prospects may be improved by careful study and advice. The most obvious of these is the group of deaf or partially deaf, but many other physical disabilities produce a similar effect. The deaf child is often regarded as mentally defective and frequently finds his way into a mental deficiency hospital, where he may develop a superimposed psychosis. It is essential that such a child should have expert advice and attention from an early age, and in his case the presenting symptom may be failure of speech development, inattention, and naughtiness, contrasting with a good level of attainment in some directions.

On the negative side, too much attention to delayed development at an early stage may distress the parent, may lead the doctor into unwise predictions, and may have a deleterious effect on the child's subsequent career. It is usually quite unjustifiable to ascertain a child under the age of 5 years as ineducable, and it is most undesirable that legal formalities such as certification as mentally defective should be undertaken at this stage. It is to be hoped that when new legislation is devised the present provision for the certification of young children as mentally defective will be replaced by a different arrangement for the care of such children, leaving it to the initiative of the parent to place them in hospital if this seems necessary. This should make it easier for the doctor to study the development and the needs of the individual child without the necessity to arrive at an early decision for purely statutory reasons.

Summary

It is seldom possible to predict accurately mental abnormality in a young child on the basis of specific behaviour disorders. Simple retardation of development is commoner than disturbed behaviour. In regard to mental deficiency it is possible to recognize only severe mental defect at an early stage. Often it is an adverse social background, not mental defect as such, which is the problem. Decisions regarding mental defect are often best postponed. The predictive value of tests under the age of 5 years is very low. A detailed history and physical examination are essential to assessment. Only 8% of 233 imbeciles and idiots drew their parents' attention by disturbed behaviour. The others were simply retarded. Disturbed behaviour of identical pattern may be found in idiots, in psychotic children, and, transiently, in normal children. The distinction must be based on the general picture, not on individual symptoms. Defectives are responsive to the environment and may develop a psychotic overlay in unfavourable circumstances. Even in severe defect early accomplishments are sometimes normal for the age. Early assessment and attention are important, especially where there are conditions which can be treated or complications such as deafness, but expediency should not be allowed to precipitate a rash decision which will prejudice the future of the child.

Permission has been received for reproduction of Fig. 1 from L. Crome and P. E. Sylvester's paper on hydrancephaly (*Arch. Dis. Childh.*, 1958, p. 235); of Figs. 2 and 3, from L. T. Hilliard and B. H. Kirman's *Mental Deficiency* (Churchill, London, 1957); and of Fig. 4 from I. Crome's article, "A Case of Lipoidosis Following Rh Factor Incompatibility" (*J. clin. Path.*, 1956, vol. 9, p. 326).

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