Binet. In schizophrenia they may be advanced. In addition, the drawings of brain-damaged children often show a disorganized figure or the figure is large and empty. In schizophrenia the figure is bizarre, confused and often full of detail. These findings are helpful in the differential diagnosis.

Other Tests: School retardation of 3 years or more is suggestive of mental deficiency with I.Q. below 70. There are educational achievement tests which are easy to give in the office, and which are of some assistance in estimating how retarded the defective child is. They are especially valuable in differentiating reading disability.

If it is necessary to know more accurately at what level of intelligence the defective child is functioning, he may be sent to a psychologist for testing. The Stanford-Binet or the Wechsler Intelligence Test Scale for Children (WISC) are the tests usually used. The former is mostly verbal. The Wechsler has the advantage of differentiating the verbal and performance tests.

The purpose of this paper is to consider the child who hears well, whose vision is intact, whose general intelligence is good, but who, nonetheless, is unable to learn to read with normal proficiency. This, then, may suffice us as an operational definition of a specific reading disability.

It should not be necessary to expound at length on the importance of this problem. Not one of us, as physicians, would have been able to attain his present position without fluency in reading. Whatever hopes we may have for our own children presuppose the development of adequate reading skills; in a society in which the written word occupies so central a position as it does in ours, illiteracy is an almost insuperable barrier to an adequate social adjustment. Reading disability, like mental deficiency of all but the most severe degree, is a disorder which is only discernible in literate society. Moreover, its diagnosed prevalence will depend upon the extent to which education is compulsory. The re-

OFFICE EVALUATION OF SPECIFIC READING DISABILITY IN CHILDREN

By Leon Eisenberg, M.D.

Children's Psychiatric Service, Harriet Lane Home

The purpose of this paper is to consider the child who hears well, whose vision is intact, whose general intelligence is good, but who, nonetheless, is unable to learn to read with normal proficiency. This, then, may suffice us as an operational definition of a specific reading disability.

It should not be necessary to expound at length on the importance of this problem. Not one of us, as physicians, would have been able to attain his present position without fluency in reading. Whatever hopes
requirement for universal education provides the screen against which the non-reader may be identified.

With such considerations in mind, it has been suggested that reading ability, like other intellectual abilities, is distributed in the population along a bell-shaped curve. This leads to the expectation that a "normal distribution" of reading ability, by analogy to curves for intelligence quotients, will automatically result in a predictable percentage of non-readers. The proponents of this thesis argue that there is no qualitative distinction between readers of varying degrees of proficiency. This contention, however, overlooks the empirical finding that epidemiologic studies of mental retardation, for example, uncover more cases in the lower ranges of intelligence than the normal curve predicts and that diagnosed mental retardation is distributed very differently within discrete social, economic and cultural groups. This points then to specific organic factors and to experiential factors that enter into the clinical problem of mental retardation. In the same way, our task with retarded readers is to distinguish those whose retardation is the result of: limited intelligence, poor schooling, inadequate motivation, sensory and neurologic handicaps, and difficulty in integrating visual symbols in the form of letters, words and sentences—specific reading disability.

THE CLINICAL PROBLEM

The child who cannot read may appear in the pediatrician's office in a variety of symptomatic guises. Only infrequently do the parents present the problem with a frank statement of perplexity over their child's inability to read. Most commonly the chief complaint is poor progress in school; reading difficulty is mentioned only incidentally or not at all as a specific concern. The intelligent non-reader is often able to disguise his disability by making use of auditory learning to memorize passages in his primer, which he appears to read as he actually repeats them by rote. As the non-reader ascends through the primary grades, his problem multiplies as all other subject matter is conditional on reading. Thus, he cannot solve the problems in arithmetic or social studies, even though he may have the skill to do so because he cannot read the examination questions. The impression is one of general academic failure. He is likely to be considered as mentally retarded or as a lazy child with the view that "he could if he would." It is difficult to imagine a more chilling indictment of a confused child, bewildered by his inability to learn despite earnest efforts to do so.

Failure by teacher, parent and physician to recognize the key problem will have devastating results. The child is now attending a class conducted in what is for him almost a foreign language. Little wonder that a large group of non-readers are referred to the physician with the chief complaint of behavior disorder. Such a child may be disturbing the class with attention-seeking behavior or with hostile acts; he may be "lost in a cloud" or may become truant. At home he may be surly and unwilling to do his homework. Or he may be of concern to his parents because of low self-esteem, withdrawal and general apathy. Frustrated by his inability to learn, bored by class exercises he cannot follow, coerced by parents and teachers to do what he cannot, the non-reader has both the inner turmoil and the lack of constructive outlet to become a major problem at home and at school. The particular symptoms displayed, whether retaliatory or inwardly directed, will depend on the balance of psychic forces determined by other constitutional and experiential factors which need not concern us here. The point I should like to make is that the likelihood of recognition of a reading disability will be a direct function of the pediatrician's alertness to its existence, because it presents most often, not as a reading problem per se, but rather as a problem of scholastic failure or as a behavior disorder.

A final word as to the clinical correlates of reading disability may be in order.
Many studies of juvenile delinquents have stressed the high proportion of non-readers that are to be found among them. It may well be true that the same oppositional attitude toward social values which manifests itself in delinquent behavior has resulted in a negative attitude toward academic learning with consequent failure to learn to read. But it is at least conceivable that the inability to read may have contributed significantly to the rebellious attitude toward society, as the youngster, frustrated by his repeated academic failure, seeks his place in the sun through channels disapproved by adults. To disentangle cause and effect is a massive task, not yet adequately undertaken. It is nonetheless clear that the reading problem per se provides a major barrier to successful rehabilitation of these youngsters within the framework of public schooling unless special attention be directed toward remedial reading measures.

DIFFERENTIAL DIAGNOSIS

The routine use of an office screening test for every child with school difficulties will permit the pediatrician readily to identify the retarded reader. No more than 5 minutes are required for the administration of the simple clinical reading test routinely employed at our clinic and recently published. Carefully standardized tests, like the Gray Oral Reading Paragraphs and the Gates Primary Reading Tests permit a more precise evaluation of reading performance. The child whose reading achievement is 2 or more years below his grade placement and/or mental age is to be considered a retarded reader.

Once difficulty in reading has been established, it is of value to determine the type of reading error. In most cases of specific reading disability the patient will confound letters that look alike (p and q, d and g) as well as those that sound alike (d and t, v and f). Reversal tendencies are likely to be prominent. The child may have great difficulty with short words which are anagrams of one another (was and saw, on and no, etc.) whereas he may do considerably better with polysyllabic words. In reading he will confabulate, substituting invented words for those he cannot read or guessing from the context of the sentence. He may read a word correctly and then fail to recognize it completely a sentence or two later.

Writing disability almost invariably accompanies the reading difficulty. Characteristically, the child may be able to copy a written or printed text without error, but does poorly when writing spontaneously or writing to dictation. Some cases show facility with mirror reading and writing. Usually ability with numbers is considerably greater than with letters, though even numbers may be written backward (6 substituted for 9, etc.). As a rule, the child has no difficulty in learning to read music, a finding which again points to the specificity of the disorder.

The errors made by the child with a specific disability do not differ qualitatively from those made by a normal child who is just learning to read. However, there is a growing quantitative distinction that may lead to the suspicion of a reading disability in the child who continues to make such “normal” errors. The perseveration of large numbers of these errors beyond the second grade is pathognomonic for the diagnosis.

Given a child with retardation in reading, we must next inquire as to his general intellectual level. The mentally defective patient will inevitably have difficulty in learning to read because of his limited ability to deal with symbols and abstractions. The necessary information may be available to the pediatrician by simple inquiry at the child's school. It is important to ascertain whether the report of the Intelligence Quotient is based on individual or group testing, as the group test will give a spuriously low value for intelligence of the retarded reader. At this point referral to a clinical psychologist is indicated. A Wechsler Intelligence Scale for Children and achievement tests will permit further analysis of over-all func-

* Obtainable from the Psychological Corporation, 304 E. 45th St., New York 17, New York.
The non-reader, penalized by his handicap, is likely to show a discrepancy between his verbal and performance scores, with the latter 15 to 20 points higher. The performance score may be regarded as a more valid indication of intellectual potential. The achievement tests, moreover, will reveal substantially better scores in arithmetic than in reading.

Having excluded mental defect as the cause, we turn to the child's history of school attendance for evidence as to the adequacy of his school experience. Frequent and prolonged absences from school, conspicuously poor teaching, or lack of motivation from the home for academic achievement may, singly or in combination, account for failure to learn despite normal intellectual endowment. In such instances, identification of the causative factors will indicate the focus of therapeutic efforts. In the first two instances, missed schooling or inadequate teaching, tutoring by standard pedagogic methods should suffice; in the third, a major task in reorienting family values is set before the physician as a representative of the community. He will rarely be successful if he attempts it alone. Other resources—the family agency, the school counseling service, the Parent-Teachers Association, indeed, all the constructive elements in the community—will have an important part to play.

We must next consider sensory defect, visual or auditory. In my experience, moderate sensory handicaps rarely provide a decisive barrier to learning to read. Only the grossest visual pathology, reducing acuity by as much as 50%—for which other symptoms and signs will be evident—is likely to interfere with the acquisition of literacy. The difficulty of the child with reading disability is not one of visual perception, but rather of the interpretation of symbols. "Not the eye but the brain learns to read."

What of the results of the neurologic examination? You will recall that no mention of the presence or absence of a lesion in the nervous system was included in the working definition of specific reading disability that was proposed in the opening paragraph of this paper. I have deliberately begged the question because the issue, as we shall see, is in dispute. For the present, it seems the wisest course to segregate cases with unequivocal brain pathology into a separate category. In such instances, the primary diagnosis is acute or chronic brain syndrome; the dyslexia is a symptomatic manifestation, presumably due to injury to the supramarginal or angular gyri of the dominant hemisphere. In contrast, the child with specific reading disability has no past history of insult to the brain; there are no gross signs of neurologic deficit and no sharply localizing signs, apart from what may be inferred from the reading disorder itself. The adjective "specific" conveys not alone the circumscribed nature of the functional handicap, but as well the lack of common agreement as to its cause.

We may now complete our diagnostic survey by returning for a moment to the psychiatric findings. In almost every instance, careful history and psychologic examination will reveal evidence of a significant degree of emotional difficulty. The key issue is whether the psychologic disturbance is secondary to the reading difficulty or the cause of it. This leads us to a consideration of the evidence bearing on etiology.

**ETIOLOGY**

Detailed commentary on the many speculations as to the cause of specific reading disability is beyond the scope of this brief clinical presentation. I shall limit myself to a summary account. The reader interested in pursuing the matter further is referred to several papers which contain exhaustive bibliographies.

As one reviews the literature, he finds a multiplicity of terms for the disorder: congenital word blindness, developmental aphasia, specific dyslexia, reading retardation, strephosymbolia, among others. The clinical findings reported are often flatly contradictory. Rarely are adequate control groups examined so that the significance of
the reported observations remains uncertain. One investigator will include cases in his series which another considers unsuitable by his definition. Most writers appear bent on ascribing the cause to a single factor—neurologic, pedagogic or emotional; inherited or acquired. The suspicion dawns on the student of the subject that the syndrome of reading disability, in itself merely a cluster of symptoms, may be the result of pathology in any one of the complex of determinants which underlie the ability to read: intact central nervous system, motivation, and adequate exposure to learning.

Since Morgan's original pediatric case of "congenital word blindness," the presence of a neurologic lesion has been suspected. Orton was the first to call attention to the frequency of left-handed and ambidextrous children among poor readers. He suggested that the reading failure was the consequence of lack of unilateral hemispheral dominance. Despite the unquestionable fact that some non-readers are right-handed, left-footed and -eyed, it is nonetheless significant that most studies report a higher incidence of ambidexterity and mixed dominance than the expected norm. It seems likely that the delay or failure to develop dominant handedness is not so much the cause of the reading problem as it is a parallel manifestation of an underlying lag in cerebral function.

Whether neurologic abnormality is reported as present or absent will obviously depend on the criteria employed. If we limit ourselves to history or signs of gross brain injury, then the findings are negative. But when more subtle indices are employed, a significant number of cases, though not all, demonstrate signs of cerebral dysfunction. For example, Rabinovitch and co-workers were able to identify a group of cases with right-left confusion, extinction and inattention phenomena, cortical sensory disturbances and nonspecific motor awkwardness. These cases showed marked discrepancies between verbal and performance scores on the Wechsler Intelligence Scale for Children and were exceedingly difficult to train to read. Ingram and Reid, with a similar approach, noted speech defects and expressive and receptive aphasias in more than half of their cases.

The electroencephalogram reveals nonspecific dysrhythmias and "immature" patterns in 50 to 70% of cases. The significance of this finding is difficult to interpret; similar percentages of nonspecific abnormality are found in association with a wide range of neuropsychiatric disorders in children.

The lack of evidence for an acquired cerebral lesion in the face of these clinical indications of cerebral dysfunction suggests the possibility of genetic transmission. Hallgren, after a thorough review of the literature, conducted careful genetic studies which led him to the conclusion that "specific dyslexia, with a high degree of probability, follows a monohybrid autosomal dominant mode of inheritance," although he allows for the occurrence of secondary (nonhereditary) cases.

At the same time, every investigator alert to the presence of psychiatric symptomatology has noted a high percentage of emotional disturbance among non-readers. Some authors have ascribed the reading difficulty to the emotional disorder. Missildine found 29 of 30 children with reading difficulty insecure, restless and upset. Ingram and Reid found that among 78 cases, 20% had broken homes, 20% had intermittent parental separation and 25% had parents in need of or receiving psychiatric treatment. Fabian found, among 20 cases, persisting traits of immaturity in the children and mild to severe signs of psychopathology in their families. Blanchard concluded that failure to learn to read is a consequence of negative attitudes toward parents being transferred to teachers. The task of disentangling causes and consequences is indeed formidable. I have already indicated how the reading problem itself makes for emotional disturbance. Yet one cannot overlook the importance of the consistent occurrence of psychopathology in the families of these
children, even though the precise relation between the emotional disorder and the specific inhibition of learning remains somewhat obscure.

A final clinical observation must be considered: the consistent preponderance of male cases, varying in different series from 5 to 20 boys for every girl. It has been suggested that this sex differential may be accounted for by the greater cultural emphasis on educational attainment for boys. According to this view, social pressure results both in more emotional turbulence in boys (and hence in emotionally determined reading disability) and in more complete case finding (thus falsely exaggerating the sex ratio). While such considerations must play some role, I, at least, cannot accept the cultural theory as a total explanation for the overwhelming preponderance of males. Rather, it seems to suggest the expression of a biologic factor, akin to the slower rate of early social maturation and academic readiness among male children.

How can we rationalize this confusing welter of data and speculation? The most reasonable proposal is that of the Michigan group. They suggest that retarded readers be divided into three categories: those with frank brain damage; those with a subclinical neurologic deficit (primary reading retardation); and those with normal reading potential but with personality or educational handicaps (secondary reading retardation).

I have already proposed that the child with a damaged brain and the child suffering from educational neglect be allocated to separate clinical categories. I might then redefine specific reading disability as the inability to read after adequate educational exposure in a child of normal intelligence, who has a defect in cerebral integrative mechanisms without signs of gross brain damage and/or an emotional disorder that interferes with learning. I suspect that even among cases in the emotional category there is some mild degree of cerebral dysfunction, which accounts for the selection of reading as the locus for the expression of the emotional disorder.

**TREATMENT**

The key to successful treatment lies in early recognition of the problem. It is here that the pediatrician can play a role of signal importance for the child and his family. The longer the difficulty persists, the greater is the degree of general academic retardation and the more distressing the whole train of emotional sequelae of reading failure. Therapeutic success may be said to vary inversely with the duration of the reading disability.

From what has been said, it follows that the diagnostic study will provide clues to the areas requiring therapeutic emphasis. The child who has a major psychiatric component will need psychiatric treatment concurrently with his remedial-reading therapy or may even need psychotherapy for an initial period in order to prepare him to accept help with reading. The child with signs of cerebral dysmaturation will require the use of highly individualized teaching methods aimed at bypassing his disability by calling into action sensory systems not usually invoked in the conventional approach to teaching of reading. He is, by far, more of a therapeutic problem. Indeed, Rabinovitch and co-workers have suggested that this characteristic is a point in differential diagnosis, as the child with a personality problem, once motivated, learns rapidly.

The essential ingredient for both categories of cases is a thoroughly trained teacher of remedial reading, who is a warm, responsive person and is sensitive to the feelings of children. His task is, in fact, a combined educational and psychotherapeutic one. The methods employed need not concern us here, save to emphasize that they are not simply a matter of wearisome repetition of orthodox teaching procedures. They emphasize a careful analysis of individual errors and methods to correct them through visual, phonetic and kinesthetic exercises. The family is best advised to cease pushing the child, to avoid home teaching which usually proves frustrating to parents as well as child, and to concentrate on building a better relationship with
him by developing his self-confidence about those things he can do well. At the same time, specific problems in family-child relations require understanding, an opportunity for expression and sympathetic guidance from the physician.

The pediatrician’s responsibility will extend from the child to the community. He should be familiar with available resources and help to guide the family into competent hands. As a citizen, he should concern himself with the adequacy of the school system and its alertness to the significance of the problem and the need for adequate remedial services. Unfortunately, there are school superintendents who refuse to recognize specific reading disability and classify all non-readers as either dull or willful children. There are others who place entire reliance on optical gadgetry, on the assumption that the problem has a visual rather than cerebral etiology.

In all such circumstances, the well-informed physician can render a major service to the children in his community by spearheading a campaign for a sound system for screening and treatment.

**SUMMARY**

An operational definition of the clinical syndrome of specific reading disability is proposed. Its clinical symptomatology is described, with emphasis on the invariably present emotional concomitants. A scheme for differential diagnosis is outlined. Theories of etiology and the evidence on which they rest are briefly reviewed. The basis for a treatment plan is provided.

Throughout, emphasis is placed on the role of the pediatrician, both as a key figure in early diagnosis and prompt treatment, and as community leader in the development of adequate educational resources for the non-reader.

There is even reason to believe that methods for the early detection and rehabilitation of children with reading disorders may make a significant contribution to the problem of juvenile delinquency. The high rate of reading disability among delinquents suggests that at least some of the poor motivation for academic achievement among these children, and their reactive antisocial behavior, may have one source in the repeated experience of frustration and failure that accompanies their reading difficulty.

**REFERENCES**

OFFICE EVALUATION OF SPECIFIC READING DISABILITY IN CHILDREN

Leon Eisenberg

Pediatrics 1959;23;997

Updated Information & Services
including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/23/5/997

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
https://shop.aap.org/licensing-permissions/

Reprints
Information about ordering reprints can be found online:
http://classic.pediatrics.aappublications.org/content/reprints
OFFICE EVALUATION OF SPECIFIC READING DISABILITY IN CHILDREN
Leon Eisenberg

Pediatrics 1959;23;997

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/23/5/997