becoming weak and he began to have pain in his toes and from the knees to the hips. This pain he describes as a "dead" or "numb pain." This was more noticeable on the right side. About this time the right hand and arm had become so weak that he was unable to use them at all. For the past four months the weakness in all his limbs has increased and the pain has become more severe, being confined largely to the extremities and being worse at night. He has been losing weight, and for about the last six months has had some difficulty in starting his water.

Examination.—Movements of the facial muscles normal; closes eyelids firmly, wrinkles forehead; shows teeth well, masseters contract firmly, tongue protruded straight, not atrophied, no fibrillary tumors. Extra-ocular muscles normal. Sensations for touch and pain in the face normal.

Upper Limbs: Movements much impaired; resistance to passive movement weak; no local atrophy anywhere, though the man is generally wasted and probably more so in the forearms than in the upper arms. Grasp of each hand is very feeble. Biceps tendon reflex, triceps tendon reflex very prompt on each side. Sensations for touch and pain are preserved in each upper limb, even in the hands, but these sensations are not so sharp as in the face. A small tumor is found in front of the left elbow about the size of a hazelnut, and is painful to touch. Right upper limb is weaker than the left.

Lower Limbs: Voluntary movement and resistance to passive movements weak in lower limbs. Sensations for touch and pain are preserved in the lower limbs, but are probably more impaired in the right lower limb than they are in the face. Patellar reflex is much exaggerated on each side. Ankle clonus present on each side, more distinct on the right. Babinski reflex is distinct and typical on each side. Sensations to touch and pain may be a little more acute in the left limb.

There is no deformity of the vertebral column. No tenderness to pressure along the spinal column. Patient can not feed nor dress himself. Cremaster reflex is present, but feeble on each side. He sways a little with eyes closed. Gait is somewhat staggering and he drags the right toes on the floor like in a hemiplegia. In walking, the right upper limb is hanging slightly flexed at the elbow. A small tumor is seen between the first and second toe on the right foot, not painful to the touch. Later other small painful tumors were found in the limbs.

Diagnosis.—Neurofibromatosis, probably with pressure on the cord by tumor of the nerve roots.

TYPES OF CONGENITAL SYMBOL AMBLYOPIA.*

J. HERBERT CLAIBORNE, M.D.
NEW YORK.

W. Pringle Morgan,¹ of Seaford, Sussex, England, was the first to point out that, in addition to the word-blindness which is the result of acquired cerebral lesion, there is a word-blindness congenital in nature which he has suggested is due to defective development of the word memory centers of the cerebral cortex.

This communication was followed by those of Hinshelwood² and Nettleship,³ Wernicke,⁴ of Buenos Ayres, and others⁵ the experience of all who have observed and studied these cases simply justifies the initial and simple conclusions of Morgan. The first American observer

who has recorded any observations on this subject is A. Schapring, of New York, who read a paper on the subject before the Section of Ophthalmology of the New York Academy of Medicine, Feb. 19, 1906. His paper on that occasion was followed by one by myself in which I referred to two cases. That paper is the basis of this one.

It was my purpose to present an extended study of two boys whom I have recently seen and who have shown themselves so backward in learning to read that at the first blush it excited in my mind a suspicion of congenital word-blindness, owing to the shyness of both of them, I have not been able to study their cases as carefully as I wish, and am compelled to present my views after a more or less imperfect investigation. I do not doubt, however, that in these two boys there is a congenital deficiency, or at least a tardy development of the word-memory centers; and the class of cases to which they belong is to be clearly and definitely differentiated from those cases of word-blindness which occur in cerebral degeneration, intracranial tumors or lesions and injuries. Congenital word-blindness appears to me to be a department of pediatrics and neurology which has not received the attention it deserves.

CASE 1.—A boy, aged 10, was sent by his teacher to my clinic at the New Amsterdam Eye and Ear Hospital on account of an injury to his left eye. In my opinion, the injury has no bearings on the symptoms which I have observed, and it is sufficient to say that he received a blow from a small shot that was thrown or fired at him by a comrade. He said the shot lodged under his upper lid and fell out on examination of it by his sister.

Examination.—He has a vitreous opacity, a ruptured iris, and greatly diminished vision in his injured eye. It was, however, fairly free from irritation.

While examining him I was struck by his slowness and peculiarity, and asked his mother what his status at school was. She said he had never yet been able to learn how to read, but could write a few simple words. I tested him on his alphabet. At times he named some letters correctly, and later on failed to name the same ones correctly. I then asked him to make several letters of the alphabet, when he made repeated errors. When asked to write capital K he wrote capital T; for capital T he wrote little t, and he could not write u at all. Although he had written a K for a T, when asked to write K he could not make it, but when asked to write his name he did so with readiness. His name is James Kennedy and he did not halt at the K. I believe his name was written automatically. The letter E seemed to have great difficulty for him. He called it S at times, at other times correctly, and finally returned to calling it S. He wrote his name James correctly but he could not call the letter E after he had written it. He kept calling it S, although it was pointed out to him and he himself pointed it out clearly. His refraction was about emmetropic but I could get no accurate test of vision since he was never certain about his letters. His field of vision was normal, and he was right-handed. In other respects he was fairly bright, seemed to understand words and commands, knew the meaning of ordinary words, recognized objects and their uses, and according to his mother was talkative, communicative, even garrulous at times, and played with other boys in the street in a normal manner.

I had a letter from his teacher, and she sent me a few tests which she made of his writing at dictation and at copying. He writes very well, particularly his name, and I repeat that this act appeared to me when I examined him to be done automatically. As stated, he was right-handed and evidently copied correctly.

I myself made some tests of his spontaneous writing, which I have unfortunately lost, and which exhibited the earmarks of classical motor aphasia, although it must be remembered that motor aphasics, as a rule,

* Read in the Section on Diseases of Children of the American Medical Association at the Fifty-seventh Annual Session, June, 1906.

1. Morgan, W. Pringle: Brit. Med. Jour., Nov. 1896.

2. Hinshelwood, James: Lancet, 1900, vol. 1, p. 1506; also Ophthalmic Review, March, 1901.

3. Nettleship, E.: Ophthalmic Review, March, 1901.

4. Wernicke, Otto (Buenos Ayres): "Angeborene Wortblindheit," Centralbl. f. pr. August, 1903, p. 264.

5. Thomas (London) The Ophthalmoscope, August, 1905, (reports 8 cases); also Stephenson, Sidney: "Congenital Word-Blindness," Lancet, September 17, 1904, referred to in Centralbl. f. pr. Augenh., 1906, p. 59, in the abstract of Thomas' article; Lechner, C. S.: Weekblad voor Geneeskuunde, August 1, 1904.

write no better from dictation than they do spontaneously. His inability to learn his letters accurately, his consequent inability to remember and recognize words, smacks of just ordinary ignorance, and there is a strong temptation to dismiss the case by calling the boy a fool; but his obvious general intelligence about objects, his normal perceptions in recognizing the meaning of spoken words, and his obedience to commands that involve other things than writing save him from this criticism. He is normal in respect of reading written or printed words or letters. His word-blindness is not for other written symbols, for he can easily recognize and correctly call figures. This case is then distinctly anomalous and is not a pure case of word-blindness, for it bears some of the marks of motor aphasia, e. g., the meaningless scroll which he wrote for me spontaneously. He is obviously word-blind for written and printed letters, but not so for figures. I have described his condition as word-blindness, but this expression is incorrect. I would describe it rather a word-amblyopia for written and printed alphabetical signs or symbols. It appears just to me to coin this expression, "word-amblyopic," to describe these cases in which the word-blindness is incomplete. The lesion is doubtless a congenital one, and it probably consists in imperfect development and tardy reaction of the word and letter memory-cells. I conceive the lesion to lie high in the cerebral cortex, probably in the region of the angular gyrus on the left side, seeing that the boy is right-handed.

CASE 2.—A boy, aged 9, in higher walks of life than the first, was brought to me by his father to see if there was anything the matter with his eyes, since he has never been able to read.

Examination.—He is a bright, smart, alert boy, comprehends words and sentences perfectly when spoken and knows common objects and their uses, but the moment he is set to look at written or printed words or to write at dictation he becomes confused and shows all the signs of shyness and a lack of self-confidence. He recognized his letters without error, but when the letters were put together to form words the difficulty began.

He called the word "how," "you," "are," he called "ray," "made," "ham" and "man;" "get," he called "gee" and "give" and on a third trial "eat;" "ham," he called "eat;" (here we recognize a faint association of ideas); "monkey," he called "kind;" "sky," "kind;" "floor," "four;" "chair," "ey." When asked to write "wood," he wrote "dans;" "dog," "dad;" and "by," "bi." "Rat" and "cat" and "all" he spelled correctly; "horse," he spelled "hoise;" "there," "thit;" "mama," "mie;" "papa," "pipa;" and "eye" he could not spell at all. He wrote his name accurately and quickly, but apparently automatically, and called it correctly afterward, but "James," which he had written with a y, he called "this." My name "Herbert," he wrote from dictation letter by letter, "Herbdrd," and called it "purram;" "Anna," he called "Ed."

When asked to make figures his whole demeanor changed and he approached the desk cheerfully and with apparent confidence. He made figures accurately, knew them all, and did several small sums in addition and subtraction as quickly as any child of his age could.

I do not believe there is any sign of motor aphasia in this case, because, although he wrote at dictation imperfectly, yet the letters of his writing were all correctly made, while they were improperly put together. They never degenerated into a meaningless and unrecognizable scrawl, as is common with motor aphasics when they write spontaneously or at dictation. His vision was normal; his fields, also; and he was right-handed. The significant and peculiar fact of this case is that the boy can recognize letters, the component parts of a word, and can pronounce each letter in each word; but when

he has finished he can not, except with several well-known words, such as cat, rat, and dog, make the sound which the combination of letters really warrants; nor can he in many instances remember the pronunciation which has been fixed by authority.

ARBITRARY PRONUNCIATIONS.

To depart for a moment from the immediate consideration of the case in hand, I would like to know who says that c-a-t spells cat, except by admission and authority of custom and wont? C-a-t spells gate, but custom and authority have made it cat, and cat it remains by statute. But d-o-g spells dog, and can not be made to spell anything else. Those who learn to read English always have this difficulty before them, and it would be interesting to know what difference there is in the relative facility with which children learn English, which is filled with such arbitrary pronunciation, and some other language in which each vowel and consonant has a definite value and the same value always under the same circumstances, such as Italian, Spanish, and German. Compare the English words "tough," "though" and "slough," for example. No such difficulties, I believe, exist in the three other languages mentioned. I believe, and it is reasonable to assume, that word-amblyopia exists more frequently in English-speaking children than in those speaking other languages that have not the difficulties of the English.

METHOD OF PUBLIC SCHOOL INSTRUCTION UPHELD.

To return to our subject: This boy can recognize the constituent parts of a word, but not the entirety, except in the case of a few words which have been firmly impressed on the torpid cerebral cells by repetition. To my mind, this fact is the source of a good prognosis for this boy and for similar cases. It seems probable that if individual letters can be remembered, words which are composed of letters should be remembered under repetition, and this prognosis is all the more supported by the present method of instruction in vogue, in the public schools at least. I refer to the method by which children are taught to read by looking at words and recognizing them as a whole. Such a boy who can differentiate a "t" from a "z" could certainly learn to differentiate the word "lake" from the word "dog," and call them correctly, since they have no resemblance whatever to each other.

In short, the matter appears to reduce itself to a repetition of impressions on the cerebral cells. But there are twenty-six letters in the alphabet, and many thousands of words in the English language, and there's the rub. When we once eliminate the old method of analyzing and spelling a word to get its pronunciation, we assist these cases of word-amblyopia by eliminating in a measure the necessity of a perfect auditory memory. For example, in pronouncing and spelling the word "mutton," two acts at least of the auditory memory are necessary: First, that m-u-t spells mut, and, second, that t-o-n spells ton; then comes into play the constructive faculty to put the two together and pronounce the combination as "mutton." But when a child is taught that the word "mutton," with its visual marks and characteristics, stands for the sound "mutton," the fact is accomplished easier and is not so complex. A simple and single act of word memory alone is sufficient. Thus the constructive act is avoided. I conceive that the modern method of teaching reading is infinitely superior to the old in that it is simpler, easier, and less complex.

In the case before us I believe that the *auditif* is im-

perfectly developed; witness the pronunciation of my name, Herbert, spelt slowly, letter by letter, as "pur-ram." This is not unreasonable, since the visual speech-center and the auditory are in juxtaposition. I believe this case is one of word-amblyopia, associated with slight word-deafness; and I think it is reasonable to coin the expression "word-amblykusic" to parallel the expression "word-amblyopia." Since the boy is right-handed, the lesion probably lies on the left side and in the angular gyrus.

DIFFICULTY WITH MATHEMATICS.

In this connection I would like to call attention to the fact that throughout their lives many people are unable to learn mathematics, or at least are more backward in learning and comprehending it than would be reasonable to expect from their general intelligence. Some years ago I was discussing this point with Prof. William R. Echols, professor of mathematics at the University of Virginia, who is not only a profound mathematician, but also a philosopher. I cited my own case as that of one who could never learn mathematics, and asked him if he had any philosophic explanation of the fact. He replied that I had no memory for symbols. I believe he was correct. Mathematics has always been a bugbear to me from childhood. Every other department of learning which I have essayed has been fairly easy to me, but in the presence of figures I become as shy and shamefaced as the last boy whom I have described was in the presence of written words. The formulas of trigonometry and conic sections, along with the rest of the higher mathematics, are to me as unintelligible as the cuneiform inscriptions on the walls of ancient Babylon, or the hieroglyphics on the pyramids of Egypt; yet I believe I can think in a fairly straight line, form a syllogism, and draw a conclusion consistent with the necessary forms of thought. Mathematics that is not transcendental deals with cubic space, or the elements of it, and with the relationship of things to each other, and many a man has been able to achieve good results by the practical handling of things without being able to reduce his acts to the analysis of symbolic thinking. This is the illustration of the so-called practical man who, when he gets uniformly good results, must understand what he is doing, yet the symbolic figuring representing his acts would be totally unintelligible to him.

I believe figure-amblyopia is the explanation of the inability of some people who, although intelligent and logical in other respects, are incapable of understanding symbolic mathematics. Now letters and words are symbols of one kind and represent thought, even as figures are symbols of another kind and represent thought, and in the last case cited we have seen that word amblyopia may exist with good figure sight and memory; even so I believe that good letter and word sight and memory may co-exist with figure-amblyopia. I believe this form of amblyopia should be classed as a distinct thing and placed in the same category with letter and word amblyopia.

IMPERFECT APPRECIATION OF MUSIC.

In this connection, it is pertinent to refer to the fact that many people apparently have an imperfect appreciation of or memory for musical sounds. There are some whose musical appreciation is so defective that they can not recognize a tune unless it has become very familiar, perhaps not even then. There are others who can carry in their memories the sequence of musical notes and who can tell when there is so much as a demi-

semi-quaver of flattening in rendition, but who can not sing or reproduce in any natural way the simplest tune with accuracy. The first class have highly defective musical memory; the second have a good memory, but can not regulate the sounds of their own voice or of an instrument in order to reproduce perfectly their auditory memory pictures. Those who have good memories and can reproduce by voice or instrument their auditory musical pictures are said to have talent for music. Savages seem to have no native faculty for making music. Their music is really noise. It is distinctly not "a concord of sweet sounds," yet they have some precedents in the singing of birds, the sighing of wind in the tree tops, the rhythmic fall of water. Music and civilization go hand in hand. Many without the so-called "good ear" play well and accurately by note. Such have poor auditory memory for sound symbols, and their art consists in good memory for written symbols and the constructive faculty of reproducing that which they know by another symbol.

The custom of singing in concert, common in some schools, particularly schools for very young children, should be cherished and extended. It would also be easy to teach the value of the written symbol by singing in concert from the text, so to cultivate the brain center for music symbols. As a boy or young man at school or college I knew none who could play an instrument unless it was some boy who learned the piano at the expense of the respect of his fellows. It is a cheerful and healthy sign nowadays to see many boys who can play one or more instruments, and no modern college is complete without a mandolin or glee club. Generations of musical habit beget musical inclinations and talent. Some nations appear to be more musical than others. That nation which has attained homogeneity and is ancient seems to be musical and in direct proportion to its homogeneity and antiquity. It seems that the Italian race has had the greatest homogeneity, antiquity and culture, and its musical talent and love of music is practically universal. Almost all Italians sing and play some instrument, many play several. The German appears next in order. If musical training were a part of the education in our schools, music would in several generations become an intellectual habit and we would establish a distinctly American school of music.

The condition of defective musical appreciation has been called *amusia*, obviously quite incorrect; the "a" privative is too sweeping. Complete loss of musical sense may be called *amusia*, but defective musical sense is *amblymusia*. In all probability there is a center for the appreciations and memory of musical notes, and it is obvious that many have imperfect memory for them. This should be classed with word and mathematical symbol amblyopia.

All these things are interesting and of importance in the training of children. When cases of this description are observed they should be carefully differentiated and similar cases should be grouped together. Methods of teaching should be instituted to waken the torpid cells into activity, and I believe the basis of the instruction should be repetition.

LEFT-HANDEDNESS.

I have, however, a suggestion to make in the matter of treatment which is more radical than the foregoing, but which may be intelligently combined with it. It appears universally admitted that in right-handed people the centers for speech and allied acts lie on the left side of the brain in the territory supplied by the middle menin-

geal artery and its branches. When symbol or auditory amblyopia exists in such children, it is a reasonable idea that they may be taught to be left-handed. It is improbable that the corresponding cells on the right side are similarly affected, and thus the speech center and the centers for symbols and sounds may be transferred entirely to that side, or the right side be so educated that it takes command. Experimentation should be made along these lines, and it is my purpose to put this idea into execution in one of the cases described.

At present no postmortem corroboration of the assumed congenital lesions is extant.

CONCLUSIONS.

1. There is an incomplete word-blindness which is congenital and which should be called word-amblyopia.

2. There is doubtless an incomplete congenital figure-blindness, which may be called figure-amblyopia. This may be the basis of the inability of some children to learn mathematics as easily as their general intelligence would lead one to expect.

3. These two forms of amblyopia may be called symbol-amblyopia.

4. There is an incomplete congenital word-deafness which should be called amblykusic to parallel the term amblyopia.

5. There is doubtless an incomplete congenital musical-note deafness which may be the basis of the inability of some people to remember and appreciate musical notes; this should be called music amblykusic, or amblymusia.

6. When cases of these kinds are met in the schools they should be carefully differentiated, properly grouped and instructed.

7. The basis of the instruction should be repetition, coupled with patience.

8. It is reasonable to teach such children to become left-handed, in order that the speech, symbol and sound centers on the right side of the brain may be cultivated to the exclusion of those on the left, or as supplemental to the defects on the left.

34 West Thirty-sixth Street.

DISCUSSION.

DR. T. W. KILMER, New York City, said that diagnosis is very difficult. It is a hard proposition to have a child brought into the clinic with the statement that it can not read. He has had several such cases and has not recognized them. When he was at college mathematics was his worst branch. He has always had special difficulty with the infant-feeding formulas because of the figures. Also, much money has been spent on his musical education. He plays by ear on several instruments, but does not know a note. Probably he has amblykusic, which Dr. Claiborne mentioned. He asked regarding prognosis and treatment, whether the prognosis is good, and whether Dr. Claiborne advocates removing the children from school. With reference to the ingenious plan of teaching a child to be left-handed, he asked whether Dr. Claiborne has carried it out or has just begun it.

DR. J. H. W. RHEIN, Philadelphia, said that in Dr. Claiborne's second case it would seem that the nature of the labor would have some bearing on the etiology of the condition which Dr. Claiborne described as congenital word blindness. If the child had had a hemorrhage which caused pressure in the region of the temporal convolutions on one side, it would readily explain some of the symptoms described. Whether the birth was easy or difficult, whether forceps were used, and whether there were symptoms immediately after birth indicating injury at the time of birth are important facts to be considered in explaining the nature of the interesting phenomena described.

DR. J. H. CLAIBORNE, New York City, said that, not being an authority on the subject, it was difficult for him to express

a definite opinion of prognosis. Inasmuch as each patient could recognize simple words like cat and dog, which had been constantly repeated to them by their teachers, it was clear that by repetition something could be done for them. He believed that in proportion as an impression can be produced on their minds by repetition, in that proportion can a good prognosis be made. Dr. Claiborne said that Dr. Kilmer has good musical sense, but has what might be called symbol amblyopia. Dr. Rhein has suggested a new thought in speaking of the nature of the labor. Cases should be studied and the labor should be inquired about, so as to ascertain where the harm was done, and on which side. Dr. Claiborne does not think that children should be set down as deficient in the public schools with no specialization of their deficiency. While they are classed to some extent in the public schools, no one has yet pointed out exactly in what respect they are deficient. Obviously they can not be treated until it is known in what respect they are deficient. If they have symbol amblyopia for letters or reading, such children should be put together and by repeating words and sounds, he believes they could be taught to read. In the matter of musical sense, of course, if one does not wish to study music, one should not be compelled. One of the greatest professors of the universities told him that he not only could not understand music nor appreciate it, but that it was painful to him. Dr. Claiborne added that this is the first time the subject has been discussed in the United States. It has been brought forward in England, in Germany and in South America.

NEURASTHENIA AS MODIFIED BY MODERN CONDITIONS; AND THEIR PREVENTION.*

THOMAS C. ELY, A.M., M.D.

PHILADELPHIA.

Whether neurasthenia be a condition or a disease or whether the term itself be properly or improperly used, the fact of its existence, of its untold mystery and increasing frequency is as certain as is the fact of civilization itself.

In all the fields of nervous maladies none is more widespread in its distribution and perhaps none more preventable than neurasthenia; a disease of unknown character and localization, the exact nature and seat speculative only; partly a morbid psychical asthenia and partly physical asthenia and irritability; so closely allied to hysteria and hypochondriasis that such can only be differentiated by grouping symptoms, by the symptoms-complex; simulating often degenerative diseases as tabes and general paresis¹ or incipient tumors; closely allied, often a seemingly transition stage, to the most grave psychic diseases; of no known pathology, except it be the late imperfect pathology of fatigue cells; the only sure known phenomena being the assured results, the symptoms which are protean.

Whether the conditions be designated as nervous exhaustion, nervous weakness or irritability, encephalasthenia, the American disease, "a paresis of attention and will," psychic fatigue, a diminished power of resistance to nervous and emotional strains, an "abnormal mental condition," or "disturbed ideational life," or whether we limit the term neurasthenia to conditions of the nervous system of lowered vitality to which functional disorder of some bodily organ may be assigned as a cause; or whether we include, as is often the case, under neurasthenia "many varied types of psychic disorders as the fear neuroses, insanity of doubt, different obsessions, hypochondriases, vasomotor paralysis, the

* Read in the Section on Nervous and Mental Diseases of the American Medical Association, at the Fifty-seventh Annual Session, June, 1906.

1. Osler: "Practice of Medicine."