

would groan under the burden of many corrective establishments. But, on the other hand, it can hardly be maintained that penal servitude for a year is the best course of treatment for a man of depraved and weakly constitution, who has acquired habits of evil tendency which will, under the present circumstances, gather strength and ultimately destroy him.

*On Certain Defects of Articulation in Children, with Cases Illustrating the Results of Education on the Oral System.**
By W. B. HADDEN, M.D.Lond., F.R.C.P., Assistant Physician to St. Thomas's Hospital and to the Hospital for Sick Children.

CASE I.—The patient was a boy, aged eleven, who came under my care in August, 1889. His father died in Colney Hatch Asylum ten years previously, but the form of insanity was doubtful. The mother was alive and healthy. There was only one other child, a girl, aged fifteen; she was healthy, intelligent, articulated perfectly, and was right-handed.

As a baby, the patient was healthy, and was not backward in teething or in walking. He had had no illnesses, except measles and whooping cough, which occurred when he was between two and three years old. The mother noticed that the child was left-handed when he was about four years of age. He did not speak at all until he was between three and four years old, when he began to make sounds. Up to that age he seemed to have had no words at all, expressing his wants by nodding or shaking the head or by pointing. It was stated that at the age of six he said a few words, such as "manma" and "no"; but it was his habit to be silent up to two years ago, when he began to talk in the manner to be described. No defect of articulation was present in any relatives or in any person with whom he was in contact. On August 20th he was admitted into St. Thomas's Hospital. He was a bright, healthy boy, somewhat under-sized, but free from organic disease. He was noticed to have frequent grimaces and sniffings, chiefly when excited or watched, but there were no movements of any other part of the body. The head was well formed; and the palate was slightly arched, but otherwise the fauces were natural, and the tongue could be moved freely. He was left-handed for all purposes, although he could use his right hand as well, or nearly as well, as his left.

* I have to express my great indebtedness to Miss Masson (the ward sister at St. Thomas's Hospital) for the greater part of the notes of the first two cases. I have also to state that this lady superintended the instruction given to the patients, and that the result achieved was largely due to her unremitting attention and to her thorough appreciation of the nature of these cases.

His speech was quite unintelligible to every one except his sister, who professed to understand it. She certainly could make out what he meant, but I am not clear if she understood the details of his speech. He could not pronounce his own name properly, and even the simplest words, such as "cat," could not be rendered so as to be recognized by others. When he talked or read it was evident that he was dividing off into syllables, although the sounds were unintelligible gibberish. He only stammered in saying the word *dedorch*, his rendering of *w* (see alphabet). He usually pronounced the elementary sounds and the letters of the alphabet in the same manner when tested on different occasions. Sometimes, however, there were slight variations both in saying them and in repeating the Lord's Prayer. This was his alphabet on admission:—

A	B	C	D	E	F	G	H	I	J	K	L	M	N
ah	be	ve	te	ee	fish	te	vatch	ah	dah	vah	ve	ve	ve
	O	P	Q	R	S	T	U	W	X	Y	Z		
	vah	pe	ve	ah	fish	te	ve	dedorch	fitch	vah	ve		

The following was his Lord's Prayer:—

THE LORD'S PRAYER.

VĪ Vēē Bēē.

Our Father which art in heaven,

Ā Fāhēē vitch vē ē vēē

Hallowed be Thy name

Ā-ānā bē vā nā

Thy kingdom come,

Vā vē-ī vā

Thy will be done in earth as it is in heaven.

Vā vē bī dā ē vēē vās ĩt ĩs ē vēē

Give us this day our daily bread,

Bē ūs ĩsh dā ā dā bēē

And forgive us our trespasses

Vā fāwvēē ūs vā tēsvāvēē

As we forgive them that trespass against us ;

Vāsh vē ē vē vā tīsh ā vā vā

And lead us not into temptation,

Vā nēā nā ĩt ĩt tā sā

But deliver us from evil,

Būt dē vā ūs vā ēē vē

For Thine is the kingdom,

Fāw vā ĩs ĩ vēē

The power and the glory,

Ā pā vā vēē

For ever and ever. Amen.

Fāw vē vēē. Amee.

On analysing the various elementary sounds it was found that he was able to produce the following :—

\bar{a} (as in ah), \bar{e} and \bar{e} (as in bet, be), \bar{f} (as in fish), aw (as in fawvee in the Lord's Prayer), \bar{u} (as in ush), and the diphthong ea (as in near). He could not pronounce o short or o long, oo , the u (as in fur), and the diphthongs ae , ie , ew . He was unable to produce the consonants j , k , l , r , w , y , z . He could pronounce b , d , f , m , n , p , s , t , sh , ch , and ch (as in the Scotch loch). These latter, however, although existing in his code, were not always produced.

On referring to the alphabet it will be seen, for example, that he made the sound of d in *dedorch* (his rendering of *w*), and yet he called d *te*. Again, in the Lord's Prayer, he gave the sound of n and m in *a-ana* and *amee*, and yet the m and n of his alphabet are both *ve*.

He could write with both the right and the left hand; with the latter he readily produced "mirror writing," as well as writing of the ordinary hand, but he could not read mirror writing.

When asked to copy or write at dictation short and simple sentences he would transcribe the first two or three words correctly, and then he would seem puzzled, the remaining words being represented either by unmeaning up and down strokes or by combinations of letters like *ve*, *va*, etc., which recalled his spoken language. He soon became hopelessly confused and unable to proceed. He could not understand his own language when I spoke it (taking, for instance, a sentence out of his Lord's Prayer), nor could he make out the meaning of words or sentences written according to his pronunciation. When reading aloud, the words, like his spontaneous utterances, were unintelligible; but it was clear that he was dividing roughly into syllables, and from questioning there was no doubt that he understood the meaning of both printed and written characters.

He remained in the large ward for about seven weeks, and soon learned some of the elementary sounds. He was taught first to pronounce the vowel sounds: o by copying the lips, a by combining the sounds \bar{a} - ee , i by combining \bar{a} - ee , u by combining ee - o .

The method adopted was really identical with that used for teaching deaf-mutes to speak. He was made to watch and then imitate the action of the lips, tongue, or teeth required for the production of the various elementary sounds; but it was often necessary actually to adjust the parts by the fingers or by forceps. After a time he succeeded in saying most of the alphabet straight through. He did not learn to roll the r or to say the soft z sound; l was apt to be n , though he could say it in one or two conjunctions; s was generally sh ; th was produced readily.

He had great difficulty in joining consonants and vowels to make even such simple words as "boy," or "cat." At the end of seven weeks he could produce separately all the elementary sounds, except z and r , and the vowel sounds in *bird* and *pearl*, but the vowel sounds in *hat*, *pear*, and *fair* were still doubtful. He could say with tolerable correctness a few simple words and phrases, such as "cat," "dog," "sister," "good-morning," "I have done it," "my rabbit is nice." His

Lord's Prayer was somewhat changed, and it was noticed that he seemed to try to rectify his mistakes. Although he had made distinct progress during the seven weeks he was under instruction, and could produce with an effort nearly all the sounds necessary for articulate language, his spontaneous utterances were but little altered. It was impossible to prevent him talking his gibberish to the patients, so at last the conclusion was inevitable that permanent amelioration would probably not be attained unless he was completely isolated. Accordingly on October 12th he was placed in a small ward, and put in charge of a special nurse, who proved herself particularly well adapted for the work. The sister of the ward (Miss Masson) succeeded in making him not only contented, but happy. He was supplied with a rabbit and a kitten for his amusement, and had his regular exercise and games out of doors. He was allowed to look at pictures, but reading to himself and conversation in his own language were forbidden. His friends agreed not to see him without special permission being granted, and the boy himself cheerfully fell in with our proposal. I think a feeling of *amour propre* on his part lent zest to his efforts, as he was anxious when he left the hospital to show off before some boys, who laughed at him and called him "fish" (see his alphabet). During the two months he was in a separate ward he had regular lessons in reading, in spelling aloud, and in writing at dictation. He was gradually taught to join syllables so as to form words, and then to combine words into sentences. He was made to speak very slowly, as any attempt at haste resulted in a relapse to his faulty pronunciation. In his endeavours to be correct, his speech acquired a slow, *staccato* character, and the words were mouthed, so that at the end of two months, when he returned to the large ward, those patients who did not know his history thought he was a foreigner, but they could understand him readily.

When he left the hospital on January 15th, 1890, he talked quite well enough to be intelligible, and fairly quickly. He could read such easy literature as the first primer; but he was still faulty in reading longer words, and was apt to be slovenly in ending them, saying, for instance, "I have been wead," meaning, "I have been reading." The following was his Lord's Prayer:—

Auë Fathë, wheech art in hevven,
 Hallo-ed be Thy name,
 Thy kingdom come,
 Thy will be done in earth as it is in hevven.
 Geeve us this day auë da-aly bed,
 And forgive us auë tespases
 As we forgive them that tesmus against us,
 And lead us not into temptation,
 But deliver us from evil,
 For Thine is the kingdom,
 The power and the gloy,
 Faw evë and evë. Amen.

After he left the hospital special attention was given to him for a time by the teacher at the Board School. Between January and the present month (November) I have seen him several times. He has not relapsed, nor has he improved to any marked degree, except that he speaks more naturally and the articulation has lost the scanning character which it previously had.

CASE II.—John S., aged seven, came under my care in January, 1890. The parents were not related. There were seven children in the family. There was no history of insanity, stammering, or defect of speech in the parents or children. The second child (a girl aged 17) was said to have six toes on the left foot, and the fifth child (a girl aged nine) was left-handed. The father had a brother who did not speak until he was seven years old, and a daughter of a brother of the mother was said to stammer slightly.

The patient was a healthy, well-nourished, intelligent boy. The mouth, tongue, and teeth were quite normal. His articulation was very defective, though not to such an extreme degree as in the other boy. The impairment of speech was noticed when he began to talk, and the mother told me that the defect was more marked as he became older, and that he showed no signs of "growing out of it," as she expected.

He could pronounce all the vowel sounds. Of the consonants, *c* was miscalled *e*; *h*, *a*; *j*, *a*; *g*, *oo*; *r*, *aa*; *s*, *etch*; *x*, *hef*; *z*, *a*. The other letters were produced correctly in the alphabet, but when he tried to combine sounds into words other defects became apparent. *D* was rendered *t* (as *tie* for *die*), the initial *g* was omitted (as *ive* and *o* for *give* and *go*), *l* was usually and *m* sometimes miscalled *n*, the initial *r* was always *w* (as *wide* for *ride*), *s* was omitted when the initial letter (as *o* for *so* and *ee* for *see*), and the *z* sound in *zee* was also left out. Like the other boy, he was slovenly in the endings of words, *choose* being *choo*, and *child* *chil*. Rarely he transposed a letter, *kite* being *ike*.

The following was his rendering of the Lord's Prayer, very slight variations being noticed on different occasions :—

Anë Favë, which art in en-en,
 Annow be ma name,
 Noy in-dom um,
 Vy will be done in ear va it e in ennung.
 E uh vith day a dai-y be,
 A foguee uh for cheh-ee-ay
 A we foh-eev vem vat cheh-futh a ain uh,
 And ee uh not va tentay-ung,
 Buh denee uh fon evil,
 Foh ine in e ingdom,
 E power an i o-wy,
 Foh ee an ee. Amen.

It is interesting to note some of the defects as seen in his Lord's Prayer.

The *th* sound was usually omitted, as *ine* and *e* for *thine* and *the*, but three times the sound of *v* was substituted (*e.g.*, *vy* for *thy*), and *m* and *n* were substituted each once. Yet he produced *th* in with his pronunciation of *this*. Again, *n* was used for *v* (*ennen*—heaven), or the *v* was omitted, as in *fogee* (*forgive*) and *ee* (*ever*), but pronounced correctly in *foheev* and *vem*. Similar inconsistencies in his rendering of various sounds will be seen on analyzing the Lord's Prayer. The tendency to mispronounce or leave out the terminal sound of a word is obvious in several instances. I determined to pursue the same plan with this boy as in the other case, but my anticipations were by no means sanguine. He was four years younger than the other, and partly, no doubt, on this account, and partly because of his natural disposition, which was stolid and indifferent, the outlook was not very hopeful. The result, however, was more favourable than I expected. At the end of three months, during about a month of which time he was isolated, he had made considerable improvement, and his articulation became quite intelligible.

Relatively he made less progress than the other boy, although the number of elementary sounds which he was capable of producing with an effort was greater. When first seen he could pronounce many sounds quite well when he set himself deliberately to the task, but when he tried to combine these sounds so as to form words and sentences, he frequently failed. This difficulty, although obvious enough in Charles M., was comparatively greater in John S., and was overcome less readily. I see the boy from time to time; he makes slow but distinct improvement, although he now receives no special guidance beyond what he may get at home and at school.

About the time when John S. first came under my notice, another boy, aged four, was brought to me with defect of articulation. It was probable that two of the father's brothers had died insane. Neither the patient nor any of the family were left-handed or the subjects of malformation.

All the children were said to be backward in talking, though not backward in other respects. There was no history of stammering or other defect of articulation in any of his relations, near or distant. The patient began to speak at the age of two, but it was not until fifteen months later that he tried to put words together. He was an intelligent boy in every way. His hearing was not affected. The palate and mouth generally were well formed. He did not stammer. He could produce all the vowel sounds, and could repeat correctly the alphabet, except the letters *c*, *d*, *g*, *j*, *k*, *l*, *q*, *t* and *w*. His power, however, to combine the elementary sounds in ordinary articulate language was very defective, and his speech accordingly was practically unintelligible. I gave the mother instructions for teaching him by the oral system, and also sent her to St. Thomas's Hospital to watch the method adopted with John S. I did not anticipate an encouraging result from isolation in so young a boy, and I therefore determined, at any rate for the present, not to resort to this measure.

At the present time, nine months after I first saw him, he has acquired more elementary sounds, and his speech, though still very imperfect, is more intelligible.

In order to appreciate thoroughly the nature of the defect in these boys, it is essential to recall the acquirement of speech in the infant. Speech is looked upon almost as an instinctive act. Nevertheless all, or nearly all, infants receive some education in the mechanism of speech. The mother or nurse, sitting facing the child, and repeating, or rather mouthing, such simple words as "baby" or "ta-ta," is familiar to everybody. At first the infant, by watching the lip movements of the mother or nurse, succeeds in reproducing the sounds by sheer mimicry, though it is not until still later that it utters them spontaneously. The earliest acquired sounds are those of the labials *b*, *p*, and *m* (e.g., *baby*, *papa*, *mama*), and the linguals *d* and *t* (as in *dada*, *ta-ta*). It is very probable that these sounds are acquired with comparative facility, because the mechanism on which they depend is simple and visible. The mechanism for the production of the consonantal sounds, *g*, *h*, *j*, *q*, and *w*, is more complicated and less manifest, and hence they are often mispronounced by young children. Again *s* is often mis-called *sh* or *th*, or when the initial letter is omitted altogether, and the sound *r*, at the commencement of a word, very frequently represented by *w* (*wun* for *run*). This latter defect indeed not uncommonly persists through life, and may occur in several members of the same family, possibly from imitation, or it may be from some inherent defect. All our efforts to teach these boys to roll the *r* were quite ineffectual, and at the present time they substitute for the initial *r* the sound of *w*. It may be taken that, at any rate at first, the young child requires some education in acquiring certain elementary sounds, but later on the more complicated sounds are reproduced, as it were, automatically, and require no special education. It would appear that when the co-ordinating centre, which presides over the mechanism of the elementary sounds concerned in speech, has received a start, its further development proceeds without special guidance, and that its evolution depends on the integrity of the auditory perceptive centres. That variations occur in the rate and degree of development of this centre is clear from the differences which are found in the facility of acquirement of speech, and also from the fact that in some instances the blundering efforts of the child sometimes

persist to a period when all elementary sounds are normally acquired. It may be, as pointed out just now, that certain defects are never remedied. There is no doubt that minor degrees of defective speech in children, not due to local conditions in the mouth, commonly disappear without special treatment. The acquirement of speech, like the acquirement of walking, is of slow growth, and in both the special muscular co-ordination is liable to variations in its rate of progress, and in its permanent fixation. It is well, perhaps, that I should emphasize the fact that the cases to which I call attention are characterized by extreme defects of articulation in children of good mental capacity, which are associated neither with mechanical conditions in the mouth nor with disease of the auditory apparatus, but are almost certainly dependent on some fault in the central nervous system.

That there is a special centre regulating the combined movements necessary for the production of speech cannot be doubted. On this point some pertinent remarks of Dr. Bristowe ("Theory and Practice of Medicine," 7th ed., pp. 991-992), are worth quoting: "Looking to the extreme complexity of these movements, it seems certain that that part of the brain in which words are transformed into ideas, and are revived in thought, acts, in the process of transforming them again into articulate speech, upon the centres of origin of the various nerves of speech through the intermediate agency of a special co-ordinating centre. . . . Words are practically innumerable. The elementary sounds, however, which by their combinations produce articulate language, are probably less than fifty in number, and this comparatively small number therefore also represents all the groups of simultaneous combined movements which the tongue and lips can be called upon to execute. It seems probable—partly on these grounds, partly from the consideration that language (apart from the mere mechanism by which it is uttered) is a mental function, and partly from the consideration that the function of a co-ordinating motorcentre is to regulate or combine groups of movements—that the duty of the assumed co-ordinating centre of speech must simply be to preside over that essential, but comparatively subordinate department of speech which consists in the production of the elementary articulate sounds."

Dr. Bristowe alludes to the possibility of a lesion affecting

this centre resulting in dumbness, and he remarks that a patient, by copying the mechanical arrangements of speech, might be taught to speak like deaf-mutes are taught. Such a case, indeed, has been published by Dr. Bristowe (*"Transactions of the Clinical Society,"* Vol. iii., reproduced in his *"Clinical Lectures and Essays on Diseases of the Nervous System,"* p. 93). I may briefly state about this patient that in addition to paralysis, which at the onset was rather widespread, there was inability to utter a single articulate sound, although for all other forms of voluntary movements the tongue, lips and cheeks were unaffected. The man was quite intelligent, understood everything that was said to him, could comprehend all that he read, and could maintain a conversation in writing, his interlocutor speaking. Dr. Bristowe's view was "that his inability to speak was most probably due to his having forgotten how to combine automatically the movements of these organs so as to obtain from them the elementary sounds which, in combination, constitute articulate speech. . . ." The man was made to copy the mechanical arrangements of the parts concerned in the production of articulate sounds, the principle, indeed, used in the instruction of deaf-mutes, and at the end of two weeks his speech was entirely restored.

This case, which comes under the class named "aphemia" by Dr. Bastian, has some affinity with the condition which is illustrated by my patients.

In the latter it would appear that there was a faulty development of that part of the brain which in Dr. Bristowe's case was profoundly paralysed. Thus may be explained the clinical differences between the two conditions—defective speech in the one, dumbness in the other.

There are a few points which are significant, and may possibly throw light on these cases, to which I will make brief allusion.

In the case of Charles M., I was originally inclined to attach some value as a means of explanation to the fact that he was left-handed. The use of the right hand in the great majority of persons is, in all probability, due to a higher development of the left hemisphere, which, "like an elder brother, takes and keeps the lead through life." Putting aside cases of mechanical interference with the right hand—such cases, for instance, as paralysis occurring in early

life—left-handedness is no mere accident, but probably dependent on what might be called “transposition of the hemispheres.” The occurrence of aphasia with left hemiplegia in left-handed people points to this. In the boy Charles M., who was left-handed, I was inclined to the belief that the speech centre, being presumably in the right hemisphere, had not only been transposed, but had been arrested in its development. John S., however, was not left-handed, although he has a sister who is so. In the third case which I mentioned there is no left-handedness either in the patient or in any member of the family. The conclusion is inevitable that there is no necessary association between these speech defects and the use of the left hand. The facts within my own knowledge warrant no decided inference; but I believe investigation in this direction may prove of value.

The history of insanity in the family in two of my cases may be of some import. I merely call attention to the fact. It is well to note the slight stammering observed in the first case, and also the fact that a cousin in the second case stammered. In the third patient there was no history of such defect.

Dr. Harrington Sainsbury* has described a case which agrees in essential points with those given in this paper. In his patient the right little toe was double, and on this point I gather that he inclined to lay some stress as indicating a tendency to malformation. This deformity was not present in my cases, but a sister of John S. was said to have six toes on the left foot.

In dealing with these cases of extreme defects of articulation, I am inclined to consider isolation a very important element. I am sure that the results of education were far more speedy, more effective, and more permanent than they would have been had the patients not been isolated.

* Case of Difficulty of Speech, “The Journal of Mental Science,” January, 1889.