SHELL SHOCK STAMMERING AND OTHER AFFECTIONS OF VOICE AND SPEECH.

By CORTLANDT MACMAHON, B.A. Oxon.

Instructor for Speech Defects at St. Bartholomew's Hospital, and Lord Knutsford's Special Hospitals for Officers, and of the Staff of King Edward VII Hospital for Officers, and Princess Henry of Battenberg's Hospital for Officers, etc.

SHELL SHOCK STAMMERING.

The stammer which has its origin in shell shock is in my experience one in which there is chiefly difficulty in the production of the voiced consonants and vowel sounds, and is one which does not present the general difficulties met with in the ordinary stammer. It may be described as a more or less severe inhibition of the speech, and it is accompanied in some cases with amnesia or the forgetting of words which obviously are required and for which other words are substituted. The condition is very suggestive of the type of aphasia known as aphemia, with which I will deal later. The prognosis of such cases is good, and in mild cases it is best to leave the trouble quite alone, and as the patient's general condition improves the stammer disappears. In more severe cases instruction should be given, and as a preliminary the patient should be taught to fill the lungs in a proper manner. This is brought about by the acquirement of an inferior lateral costal expansion during inspiration and during expiration the abdominal muscles must contract slowly and strongly, so that the diaphragm is pressed upwards by the abdominal viscera and the lower ribs drawn downwards and inwards and the air expelled from the lungs definitely and adequately. This latter action I describe as the motive power of the voice, and I train the patient to rely upon it very much indeed as he speaks. The steady breathing produces a sense of repose in the stammerer and the emotions of nervousness and anxiety yield very readily to it. One also impresses upon the stammerer that any raising of the upper chest or tensing of the muscles of the throat, tongue, and jaws, is fatal to the acquirement of normal speech. The method of breathing which I employ is fully described.

1 A paper read at a meeting of the Medical Society of London on December 12, 1916.
in the Transactions of the Medical Society of London,\textsuperscript{1} in the June number 1916 of the Royal Army Medical Corps Gazette, the Lancet of October 2, 1915, and elsewhere.

The next step is to teach the main vowel sounds and their resonator positions which means the correct position of the tongue and lips and the distance between the teeth for each main vowel sound. When the sounds are correctly shaped for, the fullest resonance is given to each sound by overtones and harmonics being produced to their fullest extent with the greatest possible ease. The main vowel sounds are 00, OH, AW, AH, A, EE. A general description of their positions is that the lips are forward, the tip of the tongue near the lower teeth and the distance between the upper and lower teeth is from $\frac{1}{2}$ inch for 00 to two inches for AH; for A the teeth nearly meet, and for EE the teeth are touching. These same sounds combine in six ways: (1) AH and 00 as in the word "sound"; (2) AH and EE making the long "I"; (3) AW and EE as in "boy" (4) OH and 00 as in "road"; (5) A and EE as in "rain" and "fair"; (6) EE and 00 as in "new" and "you." A third and last group is formed by words in which no main vowel sounds or compound sounds appear. Such words are placed either on the open AH position or the closed EE position, e.g., words like "long," "on," "have" "not," "from," "abbot," "love," and "among," are on the position of AH, and words like "little," "it," "ring," "sister," "first," and "minister," are on the position of EE. This arrangement affords an extremely easy and practical way of learning the vowel positions in nearly all words and is quite sufficient for all practical purposes. The consonants are divided into two classes—the "voiced" and the "breathed." The "voiced" consonants are produced with vibrations in the vocal cords and must be produced slowly so that, during instruction, the vibrations are distinctly heard. The "breathed" consonants are produced quickly and lightly, and the vowel sound in the word immediately sought for. The "voiced" consonants: are B, D, G, J, L, M, N, R, V, W, Y, and Z, and of these consonants the w is the 00 sound and y is the EE sound. The "breathed" consonants are C, F, H, K, P, Q, S, T. All this knowledge is very easily acquired, and with a little practice the correct production of the vowel sounds and consonants is automatically performed. Generally this amount of instruction on vowel sounds and consonants combined with steady practice in

breathing exercises is sufficient for a stammerer who has only commenced to stammer from shell shock and has not acquired the physical disabilities which supervene in a stammerer of long standing.

There are also a large number of stammerers whose stammer has been seriously intensified by shell shock or wounds, and whose stammer has existed since childhood; and there are other stammerers whose affliction has been overcome but has been resuscitated by the same causes. These cases are very much more difficult to deal with, and the instruction must necessarily be much more definite and takes a considerable time. Several alliterative examples must be given for each of the consonants which must be regularly practised and the vowel sounds taught by examples of them being given in many ways, so that in every word they are instantly recognized. There must, however, be no mental strain in learning what is necessary, it must be taken in slowly and gradually absorbed.

In stammerers of a severe type the throat muscles are hard and tensed and the tongue so drawn up at the back that it is almost in contact with the soft palate—all this must be overcome before much improvement can be sought for. Stammerers are often given very bad advice and the worst is to take a long deep breath, without explaining what correct breathing is, which they are told will make speech quite easy. The long deep breath almost invariably results in the stammerer raising the upper chest, overloading the upper part of the lungs and tensing the throat muscles; speech is thereby made an impossibility. If these efforts are persisted in the stammer is made very much worse.

Stammerers vary very much in the type of their stammer, their demeanour and sensitiveness. Generally speaking the laryngeal type of stammerer, i.e., the stammerer who has difficulty in producing the vowel sounds and voiced consonants is more easily cured than the stammerer who rapidly repeats introducing consonants and whose type of trouble is known as stuttering. In practically all types the treatment is both mental and physical but naturally the need of either form, in particular, is more strongly indicated in some stammerers than in others. In some cases the marked lack of control of the emotions is the exciting cause of the stammer: in other cases the emotions are well under control and the stammer is almost entirely of a physical nature.

It may be of interest to mention a few cases treated by this method.

(a) A young officer whom I had previously successfully treated
when he was a school boy relapsed after being twice wounded. His impediment was of the laryngeal type and when spoken to he was often quite speechless. He was anxious to pass into the Regular Army from the Reserve of Officers to which he was attached, but his stammer prevented it. I saw him nine times and he improved so rapidly that he then applied for a Medical Board to have his speech tested. In spite of this trying ordeal he came through it most successfully and was passed into the first battalion of his regiment.

(b) An officer, a patient in Londonderry House, wounded on September 7 last, began to stammer within a few minutes of receiving his wound. I saw him on September 28 and gave him full instructions in breathing and vowel sounds. The stammer was of the laryngeal type and there was also difficulty with the letter T. Unfortunately he had to go away for special treatment in connexion with his wound, but he wrote to me on October 23: "My speech has greatly improved and I may say with the exception of a very slight stammer, is restored."

(c) An officer, a patient in Moray Lodge, was blown up by a shell on April 29. A stammer supervened. When first seen on November 8 his throat muscles tensed very much and the breathing was very irregular. The speech was slow and he checked very much on the voiced consonants. He is now practically normal in speech and there is very seldom the slightest difficulty in speaking. He is still under treatment but in a week or two will be completely cured. I asked him what had helped him most in his recovery and he replied that it was the proper breathing, because he could always make himself quite quiet and free from anxiety when applying it.

(d) An officer whom I had previously treated for a severe all-round stammer before the War came and reported to me within the last fortnight that, although he had been through heavy fighting in France and was in the Serbian retreat, he never had the smallest trace of a stammer.

(e) When in a ward at St. Bartholomew's Hospital a few weeks ago a private soldier asked to see me. He told me I had treated him for a stammer at the Hospital a few years ago, since when, and although he had been badly shot in the face during the War, there was not the slightest evidence of his former impediment.

**APHASIA.**

The cases of aphasia that I have treated have nearly all exhibited a type of motor aphasia called aphemia in which the faculties of
hearing, writing and reading were normal but speech was either practically non-existent or was only produced with great difficulty. The memory was as a rule rather defective, but not seriously so. These patients must be taught the same method of breathing as in stammering and as can be imagined the correct breathing, with its calming effect on the emotions, has a great deal to do with recovery. The patient suffering from aphemia has a misconceived idea as to how voice is produced and consciously or sub-consciously tries to get the voice by physical effort, and as a sound is attempted one notices his muscles are tensed everywhere and after he has with difficulty produced a simple sound or word he is quite exhausted with the effort. The treatment, therefore, is to get as complete muscular and mental relaxation as possible, to explain that voice is a matter of resonance in the head and chest, and that it only originates in the vocal cords, and then to start on the simple vowel sounds which the patient generally produces in a few minutes. Then simple words like "sister," "nurse" and "good-night" are learnt. Then comes a time in some cases when the patient has so far recovered from the original cause of his trouble that normal speech really is possible if only relaxation of effort can occur. This accounts for the dramatic return of the speech of which one occasionally hears. The undue effort made sets up a hyperemia of the brain which is just sufficient to prevent speech being normal and when the patient unconsciously relaxes this effort he immediately speaks quite normally. This kind of recovery is not the normal course that this type of aphasia follows and the recovery is generally steady and rather slow.

I would like to mention two cases which are, I hope, of interest:—

(a) A private soldier, a patient in St. Bartholomew's Hospital, had been blown up by a shell and when I saw him he was quite speechless. After explaining what I required him to do he could within a few minutes produce vowel sounds with difficulty, and as time went on he was able to say a few simple words. I was told that he had asked in writing if he might have a tooth extracted, as he had read of recovery of speech in a similar case to his own by such means. I assured him he could recover his speech without that operation. His general condition greatly improved and I told him, after seeing him three times, that his speech would probably return immediately if he would get complete relaxation of effort. Shortly afterwards when playing cards he said, "That is my card," and from that moment his speech was quite normal.

(b) An officer in No. 1 London General Hospital was wounded
under the left eye on October 7, 1916. His speech became affected five days later in a casualty clearing station. When I saw him on November 5, he spoke with very great difficulty and was quite exhausted after saying a few words. I found that he, as in other similar cases, was tensing all his muscles as speech was attempted. I gave him advice as to breathing and how to relax the abnormal efforts he was making. On November 12, he spoke with more freedom and said to me, “I am getting a bit better,” and, “I feel I must keep quiet and it comes after a bit,” “I think far quicker than I can speak.” I asked him what had helped him most, and he replied it was the breathing. On the 15th, he spoke in rather a staccato voice, but his words did not check in the way they used to and on his discharge about a week later there was still further improvement and he should soon make a complete recovery of his normal speech. (P.S.—I saw this patient again on January 17. His general condition and speech were both excellent.)

(c) The following is a case treated by a nurse who was present at a lecture I delivered in December, 1916, and who has kindly written me spontaneously about the case. Her letter says: “I have been ordered to treat several patients suffering from shell shock; one of them has been dumb for several weeks. In all points your directions were followed implicitly. After four treatments, rather slow, distinct, voluntary speech was obtained. First he made no sound, but breathed as directed; next came a grunt and vowel sounds, then consonants and short words such as “bar,” “see,” “go,” “do,” “by.” He said the words after me with plenty of lip action, but could not do so unless I spoke first. Finally came a short sentence uttered voluntarily. I describe the progress at risk of being tedious, so that you may know your kind help was not wasted. . . . There has been no return of the nervous condition since he resumed military duty.”

Functional aphonia is treated in various ways and chiefly by electricity. The methods I use are described fully in the Lancet of March 1, 1913.

I always explain to the patient what the condition of the cords is and tell him how I want him to breathe as I attempt to get the voice back. I explain that in the aphonic condition the air from the lungs is being forced through a tensed throat and then articulated, and that, instead, muscular relaxation and vibrations must be brought about. I then press the back of the tongue down with the two middle fingers of my right hand, using a good deal of pressure and hold the tongue in that position from one to two
minutes. I repeat this and at the same time use my left hand on the throat and gently squeeze on the back of the thyroid cartilage, at the same moment asking the patient to try to make the sound of "ah" on as deep a note as possible. If there are no vibrations I tell him to cough, and as he coughs to finish the cough on the "ah" sound. The voice often returns immediately, but if it does not I ask the patient to use a tongue spatula himself and to continue it assiduously until he can get vibrations, and until I see him again. Up to the time of the War I had treated a large number of cases successfully with very few failures, but since the War I have not been quite so successful. I think the cases now are more difficult because the original cause of the aphonia is much more severe among soldiers than among civilians, and also the treatment is often attempted too soon after the aphonia has come into being. The cure of functional aphonia is very much easier to accomplish in a long-standing case than in a recent case, and I would very much prefer to treat a case of six months standing than one of six weeks. My strong belief is that for soldiers suffering from functional aphonia due to shock the best method of treatment is at first complete rest in hospital, so that the general condition is improved; then for them to go to a convalescent home and to attend as out-patients at a hospital where the necessary treatment can be given. I would again emphasize my strong conviction based on a fairly long experience, that the longer the aphonia has existed the easier is its cure, as one is getting further away from the original cause of the loss of voice.

The following cases of functional aphonia are typical of others:

(a) A private soldier was sent to me from the Minley Military Hospital, Farnborough, to St. Bartholomew's Hospital, suffering from complete aphonia of some months standing. I failed at the time to get the voice back, but I judged from what I could hear in the larynx that the voice would soon return. I saw the patient on a Thursday and advised that, if my treatment be carried out regularly, the voice would return early in the next week. The Matron of the Hospital wrote to me as follows shortly afterwards: "You asked me to let you know how Private B. got on after seeing you. I am very pleased to be able to tell you that his voice came back by degrees from that day, and, as you said, by the following Tuesday he could speak quite well, although in rather a high-pitched voice, but I think he has never really had a very deep one."

(b) An officer who had been shot through the back of the neck
Cortlandt MacMahon

on February 2, 1915, developed functional aphonia three weeks later. On May 18, of the same year he was sent to me by Dr. Lambert Lack, who kindly asked me to treat him. I saw him twice; on the first occasion he got very definite vibrations. Four days later the voice was full and resonant and a week later he was able to sing in a deep bass voice.

(P.S.—On December 13, 1916, an officer was sent to me from the Hospital at 12, Belgrave Square, by Dr. Blackett on the advice of Mr. Harold Barwell. He was completely aphonic following acute laryngitis. I saw him in the morning; vibrations returned in a few minutes and by four o'clock in the afternoon his voice was perfectly normal. On the following day an almost identical result occurred in a patient at No. 1 London General Hospital, whom I treated there.)

I will now briefly describe one or two cases which may be of interest.

(1) Severe Injury to the Larynx and Vocal Cords.—An officer, a patient in No. 1 London General Military Hospital, was shot through the throat and the arytenoid cartilages destroyed on August 24, 1916. Captain Ernest West, R.A.M.C., asked me to treat the case vocally and has kindly supplied the following note on the case: “Lieutenant J., shrapnel wound of neck involving larynx. Jagged piece of shell entered about tip of right greater cornu of hyoid and passed downwards and to left through the larynx, lodging behind left lobe of thyroid. Larynx tilted to left, arytenoid region entirely replaced by scar, glottis fixed. Anteriorly composed of immobile bands of scar stretching antero-posteriorly and webbed anteriorly; posteriorly a fixed irregular triangular gap representing pars respiratoria. Voice a hoarse whisper only. After instruction rapid alteration in voice and acquisition of a gruff voice with plenty of tone in it, easily heard the length of a hospital ward. I consider the case a very striking success.”

The treatment I gave was as follows, and it was on exactly the same lines as the treatment I use in cases of intrinsic cancer of the larynx, where after operation one cord or part of cord remains. I developed the sterno-thyroid and sterno-hyoid muscles and made the larynx sink in the throat. This action had the effect of relaxing what little of the cords was left, thereby getting vibrations. These

1 See description of a case treated by C. MacMahon, reported in the Proceedings of the Royal Society of Medicine (Laryngological Section), vol. v, p. 154, and vol. vi, p. 132.
vibrations were amplified by the resonator positions of the vowel sounds being acquired with the aid of very definite breathing.

(2) A Case of Gunshot Wound of Hard and Soft Palates — In this case the patient had been shot through the throat on May 15, 1915, and the bullet had torn its way through the hard and soft palates, causing serious injury. The case was treated at the Croydon Military Hospital, and the palates were most successfully repaired, and a most ingenious artificial velum fitted.

The speech, however, was very like that of a congenital cleft-palate patient. The air was entering markedly into the nasal cavities, and the consonants "d" and "r" were affected; "ch" and "j" were very difficult of production, as were "s" and its combinations with "t," as in "strike," and with "p," as in "speak."

It will be noticed that the consonants affected were anterior linguo-palatal consonants. I first got the back of the tongue to descend by training the sterno-thyroid and sterno-hyoid muscles to contract very strongly and by the use of a tongue spatula. The back of the tongue and the soft palate work in sympathy, and when the back of the tongue is high, the soft palate is low and vice versa: this is so in normal conditions, and in this case, as the soft palate was contracted after repair, it was unduly low, and the tongue correspondingly high. By sinking the back of the tongue and the floor of the mouth, the soft palate was elevated, and the over-supply of air was cut off from the nasal cavities. The cause of the weak production of the anterior linguo-palatal consonants was that the front part of the tongue was not free in its movement on account of its contracted condition at the back, but when this was corrected it soon resumed its normal functions, and the man spoke well; but I ought to point out that he was greatly helped by the artificial apparatus, which was so successfully fitted at the hospital.

A general rule in these cases is therefore to sink the back of the tongue and the floor of the mouth by developing the sterno-thyroid and sterno-hyoid muscles, and to re-educate the tongue in its movements where it has become deficient. In very severe cases where the roof of the mouth has been damaged beyond repair, I have noticed wonderfully good speech, which has been entirely due to the fitting of obturators by dental surgeons.

1 For full description of the treatment of the cleft palate speech, see chapter by C. MacMahon in Sir Arbuthnot Lane's new edition of "Cleft Palate and Harelip," and also Sir Watson Cheyne's and Mr. F. F. Burghardt's "Manual of Surgical Treatment," vol. iii.
(3) A Case of Head Injury with Resulting Impairment of Speech.—In this case the patient had received a severe wound in the right eye, which necessitated the removal of the eye, and there was extensive bruising round the eye-socket. The upper lip was paralysed, the speech was very blurred, and, except for simple words, it was very difficult to follow. The "s," "k," and "g" were not present, and the speech, as a whole, resembled that of a person suffering from the effects of apoplexy. I saw him first on July 19 of this year, and I wrote out the main vowel sounds, and got him to repeat them after me. I then taught him to put the consonants in front and after them. In a week's time there was great improvement, and I then wrote out some verses for him to say, introducing the main vowel sounds. In a fortnight's time he was speaking quite normally, except that the speech was rather slow, but all the consonants were produced accurately; after a month the speech was perfect.

These are some of the cases that I have been brought into contact with in connexion with the War. If my experiences are of any help to others, I shall be very thankful. I must express my deep gratitude to the many members of the medical profession, by whose kind help I have been enabled to treat the cases, and, in conclusion, I should like to say how much I appreciate the great honour of being allowed to speak before this Society for the second time within a year.