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OBSERVATIONS

ON

BELL'S SYSTEM OF "VISIBLE SPEECH"

FOR THE

DEAF MUTE.

BY LAURENCE TURNBULL, M. D.,

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Physician to the Department of the Eye and Ear, Howard Hospital, Philadelphia.

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The writer has been most favorably impressed with the great advantages of the system of "Visible Speech," or phonetic writing, of A. Melville Bell, Professor of Vocal Physiology, as a means of communicating Articulation to deaf mutes; based not upon sound, but upon the physiological actions of the vocal organs, and is desirous of interesting the physicians of the United States in its adoption by all the Institutions for the instruction of deaf mutes in this country.

In the author's work on Diseases of the Ear,\* he has given a full account of the history, progress, method, and present condition of this subject up to the date of publication, in which are set forth the advantages of the systems of symbols and manual alphabet of the "Abbé de l'Épée," of France, and of articulation and imitation of "Heinicke," of Germany. And yet our congenitally mute fellow-beings, who possess sight and the power to make sounds, want something more than is yet taught them, except in a very few institutions, so as to be able to mix with the world either for pleasure or profit. This is to be accomplished by a new, visible, and gymnastic treatment. It will be said that this has been already accomplished, and we have given some most interesting examples in our work, but it has been done only at an immense cost of time and money; and notwithstanding the outlay, only here and there can we find one who can talk without its being painful in the extreme to hear. The congenital mutes, by the old method, cannot vary the pitch of the voice; and even the semi-mutes have no power to produce modulation. For example, we have

known instances where the attempt to speak alarmed the listeners, and a desire was at once expressed in writing that the effort should not be made again. It has been so also with persons shopping, that they would have to select certain individuals to wait upon them, no others being able to understand them, although the deaf mute was very proud of the amount of speaking power he possessed.

We would not disparage signs, far be it from us, for it was one of heaven's best gifts to the "Deaf and Dumb," when God put into the heart of the good "Abbé" to devise his alphabet. It has been of incalculable benefit to all nations of the world, for with these signs communication can be made even with the Indian, Chinese, and Japanese. Still, with this knowledge, the deaf and dumb are isolated from the world and society in general. When out of the institution in which they were taught, they are unable to hold converse except with a comparatively limited number of persons.

What the deaf mute wants is to speak, and can he learn to do this? He can, with a considerable amount of mental labor, and cost in both time and money. We feel that it can be accomplished, as deaf mutes possess the main factor of voice, a perfect *larynx*, for this is the essential organ for the production of human speech. 1. There must exist vocal chords forming a part of this larynx. 2. The power of causing parallelism of the edges of these chords; without which they will not vibrate in such a manner as to give a vocal sound. In a few of the deaf and dumb this is defective in its organic formation at or before birth, so that parallelism cannot be accomplished; and,

\*A Clinical Manual of Diseases of the Ear. J. B. Lippincott & Co., Phila. Oct., 1871. pp. 393-437.



therefore, no sound is produced. In the laryngoscopic examination of deaf mute children from eight to fourteen years, motion of the muscles which open and close the glottis existed in over ninety per cent., and a certain amount of power of vibration of the chords. 3. There must be a certain degree of tension of the vocal chords, without which they will not vibrate rapidly enough to produce certain sounds. This condition of relaxation is sometimes produced by catarrhal disease, or by overstraining the parts, not only in the deaf and dumb, but in individuals possessing normal hearing. They can also have a defective voice from paralysis, tumors, ulcers, etc., of their chords, conditions which can be overcome by removal with instruments and other appropriate treatment. 4. There must also be a sufficient current of air between these paralleled edges of the vocal chords to cause them to vibrate. This is only to be accomplished by the use of gymnastic exercise, so that the muscular structures of the larynx or the muscles be so disposed as to pull the chords together or away from one another. One set of these muscles is termed thyroid, which tend to pull the thyroid cartilage up when it has been depressed by the crico-thyroid muscles; another set is the posterior arytenoid, which contract and bring the hinder parts of the vocal chords together and make their edges parallel. The expiratory or chest muscles are now employed to force air from the chest through the larynx, and a musical note, the vowel, is produced. Now this musical note will be low and harsh if the vocal chords are relaxed or diseased, or do not act smoothly from want of use; or shrill and high if the vocal chords are too tense. This difference in want of tune you may have noticed in the sounds that proceed from a violin or guitar string, if one part is relaxed and another too much tightened. The range of any voice depends upon the difference of tension which can be given to the vocal chords in these two positions. The quality of a voice, treble, base, tenor, etc., on the other hand, depends upon the formation of the particular larynx, the primitive length of its vocal chords, and their elasticity, etc.

Speech is voice modulated by the throat, tongue, and lips; this modulation of the voice into speech is effected by changing the form of the cavity of the mouth, lip, nose, and throat, by the action of the mus-

cles which move the walls of these parts. This is not to be taught simply by imitation, as in the old method, but the pupil is made to comprehend the use of every portion of the vocal apparatus by making sounds before attempting to speak words; and the new alphabet of Mr. BELL is one which is specially adapted to the purpose. By the old method, the child had simply the lips of the teacher to study; no proper alphabet or illustrations on the blackboard to assist him in the form in which the lips, tongue, etc., were to be placed; so that hundreds of sounds which a child could not obtain by the imitation method alone, have been accomplished by means of visible speech. A bright adult deaf mute, by this method, has been able to acquire most of the sounds of the English language in ten lessons.

In 1869 the first attempt was made to communicate a knowledge of "Bell's symbols" to deaf mutes in a private establishment in London, conducted by Miss Hull. No difficulty was found in giving the idea to four children, the eldest about twelve and the youngest seven years of age, and nearly all the elementary sounds of the English language were obtained from them in a few days.

Lectures were then given in various towns of the United States, on the system, and it was introduced into several institutions. Professor E. M. Gallaudet, President of the College for Deaf Mutes at Washington, thus expresses himself in regard to visible speech: "Use has been made of this system with gratifying results. It has rendered most valuable service to this department of deaf mute instruction."

In the Boston Day School for Deaf Mutes, which, by the way, should be established in every large city, Mr. A. G. Bell, son of Prof. Bell, taught the pupils by his father's method for six weeks, also instructing the teachers in the theory of the system. Of the results of this experiment, the following extracts from letters addressed to him will show the good results obtained. The committee say:—

"The system of visible speech introduced by you has given the teachers an instrument of incalculable value in teaching deaf mutes (congenital as well as others) to articulate clearly and correctly."

Miss Fuller, the Principal, gives the following opinion:—

"I can say with confidence that I have

found 'visible speech' of the greatest assistance."

The consonants b, d, and g, which are the most difficult to obtain by imitation, are, by means of the symbols, produced with great ease and accuracy; and the consonant combinations, such as ct, ks, nd, etc., which were often very faulty, are, by this system, acquired perfectly. In teaching vowels it is of especial value. The visible speech symbols make the child conscious of the correct position of the mouth for producing these sounds. Hitherto such elements have been our greatest difficulties. I have been able to correct, in several cases, very imperfect sounds which had baffled all attempts under the old system of imitation. The superintendent, John D. Philbrick, Esq., thus indorses what has already been stated:—

"Heretofore, instruction of deaf mutes in artificial articulation has been wholly imitative and empirical; and although the system is extensively employed, it has produced useful results only at the expense of incredible labor and patience on the part of both teachers and pupils. You have, by your experiment in our school, proved the practicability of producing in congenital deaf mutes, perfect articulation, with vastly less labor than has been required to produce only imperfect articulation. What is still more wonderful, if possible, you have succeeded in enabling deaf mute pupils to modulate the voice, by giving a higher and a lower pitch, and upward and downward and circumflex inflections." The system\* does not, as stated by Mr. Bell, interfere with any existing plan of education. Visible speech takes no part in the contest between articulation on the one hand, and signs and manual alphabets on the other. Here is a means by which you can obtain perfect articulation for deaf mutes; make what use of it you choose.

He places it in the hands of the teacher with general directions how to use it.

"Visible speech" is not necessarily associated with lip-reading. There is no doubt that in schools where lip-reading is employed the symbols will materially assist the pupils by showing them *what to look*

\* American Annals of the Deaf and Dumb, Visible Speech, by A. Graham Bell, January, 1872, p. 1, to whom the writer is indebted for the illustrations and the facts contained in these papers in reference to his father's method. (A. Melville Bell, Professor of Vocal Physiology, and author of a new species of phonetic writing.)

for in the *mouths of hearing persons*; but this is apart from its greater sphere of usefulness, as a means of communicating articulation.

"Visible speech" does not profess to teach the deaf to *modulate their voices*; it deals with articulation pure and simple; yet deaf mutes may be taught to modulate their voices, and to read with expression by means of visible speech, which aims at representing pictorially the changes of the voice in regard to force, duration, and pitch. This system constitutes an elocutionary, and in its fullest development a musical notation, accomplishing for the throat what visible speech does for the mouth.

We all know that most of the deaf mutes give, on the play-ground and elsewhere, perfectly natural inflections; they laugh and cry like other children, except in a heightened pitch. The problem is to make them conscious of the movements of their voices. Experiments which the writer has witnessed within a few weeks in the American Asylum, Hartford, prove that this can be done. (For this opportunity we are indebted to Prof. Stone and his assistant, Miss Sweet).

Before commencing to teach a class of deaf mutes in articulation, each one should be carefully examined by the physician of the institution, both the external and middle portions of the ear, by means of the aural speculum, with bright light. Also auscultation of the middle and internal ear by the double stethoscope. Rhinoscopy should also be employed; which is the inspection of the posterior region of the nares by reflected light. A mouth mirror is to be placed beneath and behind the soft palate and uvula, with its reflectory surface looking upwards and forwards, so as to inspect the posterior opening of the nasal passage, Eustachian tube, etc. This same apparatus can be employed to examine the throat by means of an image of the parts reflected upon a small mirror placed within the pharynx, with its reflecting surface turned downwards, the ray of light being received on the mirror from the sun or artificial light. To examine the anterior portion of the nose, a bright reflected light is required, and Kramer's bivalve ear speculum answers the purpose very well. A careful certificate should then be made out, of the condition of the parts, and each case should be numbered in the order in which it is found; also the mental condition,

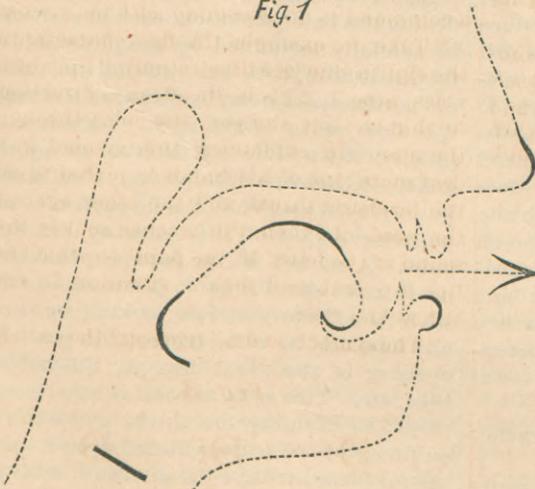
or fitness to undergo the brain labor necessary to acquire the English language in all its fullness. In this way it would save the teacher the unpleasant duty of attempting to teach the pupil for a time, and then informing him that he was defective, and unable to go on with this form of study. A painful instance of this kind we recently noticed on a visit to one of our institutions.

#### MODE OF COMMUNICATING VISIBLE SPEECH TO DEAF MUTES.

"The elementary symbols are pictorial of parts of the mouth, and of their modes of action. As the various organs of speech are disposed in forming any particular sound, the corresponding symbols are put together to build up a compound character indicative of the position of the mouth. This compound character most truly represents the sound intended, because no person can put his mouth into the position indicated without producing it.

"The symbols have to be successfully explained to deaf mutes in the following manner: The outline of a face turned toward the right is drawn upon the blackboard (see Fig. 1), and a representation of the inside

Fig. 1



of the mouth is added. The pupil's attention is directed to the various parts of the diagram, and he shows his appreciation by touching the corresponding portions of his own face or mouth. When the teacher points to the arrow-head, a motion of the hand is made to suggest that it means "air coming out of the mouth."

"Those portions of the face represented in

the illustration by dotted lines are then erased from the board, and attention is directed to the broken remains of the diagram. When the teacher points to the fragmentary nose, lip, or tongue, etc., the pupil touches his own nose, lip, or tongue.

"It will be observed that these disjointed portions of the diagram are the *Visible Speech symbols for the corresponding parts of the mouth*. The symbol for "lip" is the outline of a lip; that for the point of the tongue its picture, and so with other parts.

"The sign for the lip is used for every sound formed by the lips; so with the point of the tongue, the top or "front" of the tongue, and the back of the tongue.

"The sign for the throat represents a mere chink or slit in the throat, and is pictorial of the vocalizing condition of the glottis. It therefore means "voice."

"The sign for the nose is, in reality, pictorial of the uvula, the pendulous extremity of the soft palate. When the soft palate is depressed, the breath passes up behind it and escapes through the nostrils. When it is raised, the communication between nose and mouth is cut off. Hence the application of a symbol originally pictorial of the soft palate to the nose. It means "air passing through the nostrils."

"But to return to our pupil. He knows nothing of the deep meaning underlying these symbols. To him the strange lines upon the board are only the remains of a picture. Filling up the gaps, in imagination he recognizes the crooked line as a portion of the nose, the curves as so many parts of the mouth, and the straight line as the throat.

The next step is to isolate the symbols, so that our deaf-mute shall recognize them independently of their position in the diagram. They are accordingly written in one line below the fragmentary picture.

The crooked character is shown, by reference to the face above, to be the same as the nose; the straight line, the throat; and the curves, the various parts of the mouth.

"The elementary forms are then built up into more complex shapes.

"The second line illustrates the junction of the curves with the straight line.

"In the first symbol the curve is seen to be the under lip, and the straight line the

throat. The name of the symbol is "lip-voice." The child describes it by pointing to his lip and then to his throat.

"The third line shows the union of the nose sign with the various curves; and the fourth exhibits a triple combination, viz: a part of the mouth, with nose and voice signs added.

"A character indicating a peculiar position of the vocal organs is next introduced. Observe the first symbol in the fifth line. The space enclosed by the curve is symbolically *shut in* by a line drawn across the ends.

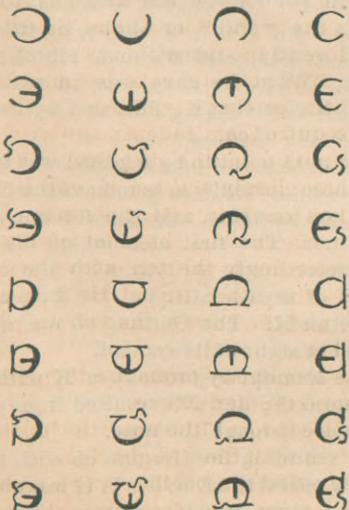
Thus a straight line (made thin to distinguish it from "voice") is called "shut." The idea is conveyed by forcibly closing a book before the eyes of the pupil. Whenever he names the sign he imitates this motion.

"The fifth line exhibits the union of this symbol with the various curves. The first character in the line, named "lip-shut," is described by touching the under lip, and then imitating with the hands the closing of a book. Here, for the first time, the idea of the directive nature of the symbols begins to dawn upon the deaf-mute. In conducting classes I have invariably found that when this point has been reached, at least one of the pupils would illustrate the symbol by *shutting his lips*.

"The characters in the sixth line are composed of a curve and the signs "shut, voice."

"Those in the seventh contain a curve and "shut, nose;" and the symbols in the eighth line are analyzed into a curve and "shut, voice, nose."

Fig. 2.



(Key to Fig. 2.)

N	V	L	P	F	B
LV	PV	FV	BV		
LN	PN	FN	BN		
LVN	PVN	FVN	BVN		
LS	PS	FS	BS		
LSV	PSV	FSV	BSV		
LSN	PSN	FSN	BSN		
LSVN	PSVN	FSVN	BSVN		

"The broken outline of the face, which has been retained as an assistance to the memory, is now dispensed with, and the pupil is required to describe all the symbols again.

"For the convenience of the reader the names of the symbols are given in a tabular form, using the initial letter of the words, shut, voice, nose, lip, point, front, back.

"It will be observed that, though at the first lesson thirty-four characters have been introduced, the memory is burdened with only four forms, viz: a curve (turned in different directions), a crooked line, a thick, straight line, and a thin one.

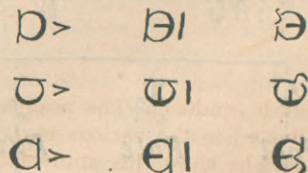
"Though the sounds of speech may be *infinite* in variety, they are all formed by a limited number of organs; and they can all be represented by the combinations of ten elementary symbols.

"The name of a sound-symbol is in reality a command *to do something with the mouth*.

"Take, for example, the first character in the eighth line (see illustration), "lip, shut, voice, nose." This is, in effect, a direction to shut the lips and pass the voice through the nose. In explaining this symbol to a deaf mute, one of his hands is placed upon the teacher's throat, and the other against the nose. If, then, the teacher makes the sound of the letter M, the pupil *sees* that the lips are shut, and *feels* a vibration in the throat and nose.

"The symbols in fig. 3 represent the sounds

Fig. 3.



of the following letters, as taught to the children in the Boston school:

P B M  
T D N  
K G NG.

"All one can say concerning the Roman letters is, that P is P, B B, etc. But the symbols tell us that P is formed by shutting the lips, and then making a puff of air, while for B, the lips are to be shut while the voice is sounded, and then a puff of voice is to be given, etc.

"The characters exhibit to the eye all the relations that the sounds themselves do to the ear; and the organic relations are just as clearly shown:

As P is to B, so is T to D, and K to G.

As B is to M, so is D to N, and G to NG.

As P is to T, so is B to D, and M to N.

As P is to K, so is B to G, and M to NG, etc., etc.

"P, B, and M have the "lip" and "shut" signs in common; and in sounding all, the lips are shut.

"T, D, N, agree in shutting off the breath by means of the point of the tongue, and K, G, NG, in the closing action being performed by the back of the tongue.

"Furthermore, the sounds P, T, K (represented by the same symbol, turned in different directions), are made by the same

organic action performed at different parts of the mouth; so with B, D, G, and M, N, NG.

"When a deaf mute has thoroughly mastered the meaning of the symbols, he is required to sound one of the characters; that is, the attempt is to be made to do with the mouth what the symbol directs.

"The pupil, having little or no control over the movements of the vocal organs, will probably make a very different sound from that intended; but the first point gained is, that he makes a noise of some kind. Whatever it happens to be, whether a cough, or a growl, or a sneeze(!), it can be written symbolically. From this sound as a starting-point, others can be developed in every direction, until all the English elements have been obtained.

Mr. Bell illustrates this by a case that actually occurred.

A middle-aged deaf mute, a resident of Boston, was studying the symbols.

His attention was directed to the vibration of the throat in sounding voice. He attempted to imitate this by a peculiar hawking noise, somewhat as if he were coughing up phlegm.

After repeating the sound several times, he analyzed the representation of it (see fig. 4), and thus became conscious of what his mouth was doing. In forming this sound the tongue is first put back so as to shut off the air from the mouth. The breath is then forced out between the tongue and soft palate in such a way as to set the uvula vibrating.

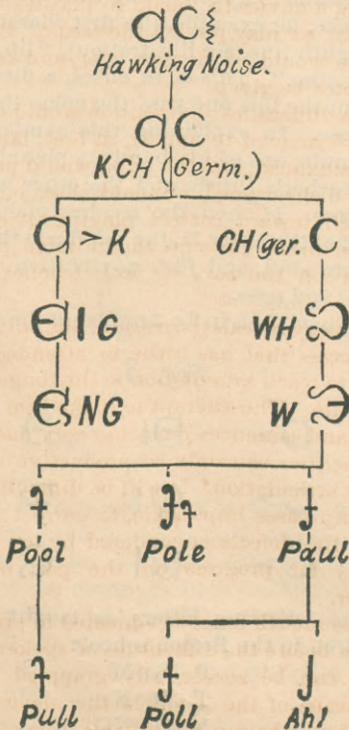
Upon presenting the symbols to him, minus the "trill" or shake, he made the sound gently, and without vibrating the uvula. What he gave was, in reality, an English element (K), followed by the German sound of *ch*.

The next point to be attained was to separate these elements, so as to have the English sound on one side, and the foreign one on the other. The first element of his sound was accordingly written with the sign for a puff of breath after it. He gave at once the letter K. The German *ch* was also obtained at sight of its symbol.

The attempt to pronounce K with voice produced G; and NG resulted from passing the voice through the nose.

By sounding the German *ch* with the lips nearly closed the English WH was obtained. W was given by adding voice. This sound

Fig. 4.



may be considered, for all practical purposes, identical with the vowel *oo* in "pool." From this vowel five others were obtained by merely opening the mouth very gradually.

Thus, from the original hawking noise, eleven English sounds were developed by the directive power of the symbols.

This method of leading from one sound to another renders the acquisition of the English elements a matter of absolute certainty; but it is inapplicable to very young children. In all cases, however, mechanical assistance will accomplish what the intellect of the child is unable to do. The symbols inform the teacher of the correct position of the organs in producing any sound. By the exercise of a little ingenuity the child's tongue can be pushed into the required position by means of a pencil or pen-holder.

Mechanical assistance has been found to be so absolutely necessary that a manipulator of convenient shape has been constructed of ivory.

Suppose we fail to obtain *K* from a child; a sound of *similar formation, but further forward in the mouth, may be experimented upon. We shall presume our pupil can pronounce T. In T, the shutting action is performed by the point of the tongue; in K, by the back (see fig. 3).*

If the teacher holds the manipulator so as to prevent any portion of the tongue from rising *except the back, the attempt on the part of the pupil to say T will produce K. The manipulator is at once placed in the hands of the pupil himself, and the experiment is repeated. A mirror held before his face shows him the position of his tongue. It invariably follows that after a few attempts the child is enabled to pronounce the sound without any assistance whatever.*

A plan for the development of sounds by means of the manipulator has been devised. It may be interesting to know that twenty-six English elements can be *forced from the one sound TH.*"\*

#### PLAN OF INSTRUCTION.

"In teaching articulation a radical difference must be made at the outset between the semi-mute and the deaf-mute proper. The former has already *learned to talk*; the latter has everything to learn.

"Our object should be to *keep up the knowledge of spoken language possessed by the*

semi-mute, and to teach him the pronunciation of new words. This can be accomplished by the symbols of Visible Speech; and his voice may be prevented from becoming monotonous by the use of the allied elocutionary notation.

"But the congenital deaf-mute (who may be taken as the type of the other class) has had no practice in the use of his vocal organs; and his mouth is at first incapable of using the language of hearing persons. The instrument of speech must be mastered like any other instrument, *by slow degrees.*

"Hearing children (being guided only by imitation) require five or six years' practice in order to talk correctly, and even then it is astonishing how many grow up with defective articulation.

"To expect the congenital deaf-mute to talk the moment he has mastered the elements of speech would be as unreasonable as to expect a child to play one of Beethoven's sonatas when he only knew the notes of his piano. He must have long and patient practice of scales and exercises, in order to obtain command over his instrument; he must have oral gymnastics, as a preparation for speech.

"Should any one try the experiment of teaching a novice in music to play a sonata correctly, we may predict the result. Rapid passages would be slurred over, and many false notes be given.

"The difficulties of execution would cause the performance to appear, at best, labored and mechanical, and the pupil would probably be disheartened. Should there be any approach toward correct playing, it could only be made through indomitable perseverance on the part of both teacher and pupil.

"Analogy reveals the cause of the only partial success that has hitherto attended the efforts to teach articulation to the congenital deaf-mute. The attempt to make him utter words and sentences *from the very outset of his education* can only be productive of imperfect articulation. It will be difficult, and in many cases impossible, to correct afterwards the defects engendered by too great anxiety for progress on the part of his teacher.

"The mouth must be educated to produce sounds before the difficulties of spoken language can be successfully grappled with. By means of the symbols the elementary sounds may be combined in all sorts of ways

\* Op. cit.

to form *senseless* compounds analogous to syllables, words, and sentences. These should be uttered at first very slowly; then, by degrees, faster and faster, until the power of correct and rapid utterance has been attained. Then, and not till then, will it be safe to introduce articulation with sense attached.

Mr. Bell has suggested the following plan of instruction, which is suited to the capability of the very youngest beginner.

The imitative faculty of the child should be educated to the utmost, by causing him to copy the motions of the teacher's mouth. Direct him to make his tongue hard or soft, round or spread out flat; let him move it backward and forward, up and down, or in any way the fancy of the teacher may dictate.

English sounds may be obtained by imitation, and associated arbitrarily with their symbols.

The teacher should be careful not to spend too much time in laborious and disheartening efforts to obtain by imitation what will be more easily and certainly acquired afterwards. What is wanted is a mere foundation to work upon in the future. A skillful teacher will not confine himself to English elements, but will take whatever sound the child happens to make, and associate *that* with its correct symbol.

The sounds obtained are to be practiced in easy monosyllabic combinations, until they can be certainly discriminated.

When the child's attention is capable of being fixed, the meaning of the Visible Speech symbols may be explained to him. After this, he must *describe* as well as *sound* the elements mastered. No difficulty will be found with children of six or seven years of age.

New sounds should next be developed by appealing to the mind through the analogies of the symbols, and by forcing the tongue into new positions by means of the manipulator. Thus the mind, the eye, and the sense of touch in the pupil co-operate with the mechanical skill of the teacher to produce sure and certain results.

No articulation, however perfect, will be *agreeable* unless strict attention is paid to the accent and quantity of syllables, and to the modulation of the voice. Mr. Bell has therefore recommended that the study of rhythm, and the cultivation of the voice,

should be added as *separate branches of education*, as soon as possible.

It is apart from the present subject to enter into a description of the notation for rhythm and modulation. Suffice it to say that a rhythmical exercise may be written upon the board. The children are required, at first, to clap their hands, or tap their slates, or make some other visible motion, *in concert*, while marching round the room. The rhythmical repetition of a syllable can then be substituted for the clapping of the hands, the pupils marching as before. Finally, the marching is relinquished, and the teacher beats time with his hand instead. In this way an appreciation of rhythm is developed before applying it to words. Classes can be exercised with regular rhythm, as it occurs in poetry, and individuals with the irregular rhythm of prose.

In regard to the modulations of the voice, all deaf-mutes can be trained to recognize at least five indefinite pitches. These may be called, "very high, high, medium, low, very low." By gliding from one to another, inflections can be produced. When these have once been obtained, we may seek to associate them with *feelings*.

Suppose the word "farm" to be uttered with a rising inflection, suggestive of interrogation. Let the teacher *look* interrogatively. The pupil will unconsciously imbibe the idea that the word "farm," with such a rise of the voice, is equivalent to the sentence, "Is it a farm?" So with other inflections. Modulations of the voice, expressive of surprise, sorrow, anger, etc., should have their meanings visibly apparent in the face of the teacher.

Mr. Bell looks forward with confidence to the time when deaf articulators will be taught the principles of elocution, so as to be enabled to read and speak with expression.

The following is a brief recapitulation of the plan of instruction:

- I. 1. Educate the imitative faculty.
2. Obtain sounds by imitation, and associate them arbitrarily with their symbols.
- II. 1. Understand the symbols of Visible Speech, and describe the sounds obtained by imitation.
2. Utter easy monosyllables, formed from the sounds obtained by imitation.
3. Commence the study of rhythmical motions.

4. Obtain differences of pitch.
- III. 1. Develop the remainder of the English alphabet from the sounds obtained by imitation.
2. Give oral gymnastics, with monosyllabic combinations of all the sounds perfectly uttered.
3. Repeat a syllable rhythmically.
4. Glide from pitch to pitch, so as to obtain as great a variety of inflections as possible.
- IV. 1. Practice oral gymnastics with polysyllabic combinations, giving differences of accent and quantity.
2. Repeat a monosyllable, with differences of accent and quantity, and with inflections of the voice.
- V. 1. Utter polysyllables containing difficult combinations of consonants.
2. Give polysyllabic combinations analogous to sentences, attending to accent, quantity, and to the movements of the voice.
3. Teach the spoken names of familiar objects. Seek merely to form a vocabulary.
4. Repeat words with different inflections, so as to convey an idea of the expressiveness of the various tones.
- VI. Articulate sentences with fluency and distinctness, attending to accent, quantity, and to the inflections of the voice.”\*

During the months of May and June, 1872, Mr. A. G. Bell introduced his father's system of “visible speech” at the American Deaf and Dumb Asylum, at Hartford, Connecticut, and, on June 22d, his report was published, addressed to Prof. Stone, the Principal, in which he makes the following statement.

“My father's system is now in practical operation in your institution, and two of your teachers, Mr. Clark and Miss Julia Sweet, are qualified to carry on our methods of instruction. The full results of the introduction of the system cannot be known for a long time to come. Since the commencement of May, ten pupils who had no knowledge of speech, and twenty-four semi-mutes, have been under instruction.

“*Results with semi-mutes.*—1. These pupils could pronounce, in May, 533 English elements; that is, they had retained 62 per cent. of the sounds acquired before they became deaf. 2. They have since mastered 98 sounds by means of visible speech, so that 73 per cent. of the English elements are now correct. 3. Several of the pupils had very

\*American Annals of the Deaf and Dumb, edited by Edward A. Fay, January 1872, p. 1.

disagreeable voices. In every case the power has been gained of producing natural tones. 4. The majority of the semi-mutes can vary the pitch of the voice.

“*Results obtained with ten pupils who had no knowledge of speech.*—1. 86 of the English sounds, or 24 per cent., were obtained, in May, by imitation. 2. From these sounds 189 others have been developed by visible speech, so that 76 per cent. of the English elements are now correct. 3. As in the case of the semi-mutes, all who have had disagreeable voices have now the power of producing natural tones. 4. All can vary the pitch of the voice. 5. Two young ladies can produce natural inflections. 6. Although it could scarcely be expected that these pupils should have acquired, in seven weeks, sufficient power over the instrument of speech to articulate sentences correctly, yet seven of them have succeeded in an astonishing degree. The remaining three pupils have progressed as satisfactorily as the others in mastering the elementary sounds. Two of them succeeded in articulating sentences, but in an imperfect manner. The third has been absent for some time. The progress of all these pupils, although they have been taught by four persons, has been so similar, as to show that success depends more upon the system than the teacher.

“At the exhibition the following sentences were uttered by these pupils almost as perfectly as if they had possessed hearing. ‘I want to talk,’ spoken by Miss Tait; ‘How do you do?’ by Miss Bailey; ‘I love papa and mamma,’ by Master Clark; ‘I want some water,’ by Master Bigelow; ‘I want to go home,’ by Master Fenner; ‘The beef is tough,’ by Miss Chaffin; ‘I am deaf but not dumb,’ by Miss Whiting. Miss Whiting and Miss Chaffin illustrated the power of the symbols over the unseen parts of the mouth, by making their voices disagreeable or sweet, at command. Miss Chaffin pronounced the word papa, varying the voice in a variety of ways.

“At the conclusion of the exhibition, Mr. Clark and Miss Sweet kindly consented to illustrate the power of the symbols in a more conclusive manner than could be done by the pupils. They accordingly left the hall, while the following words and noises were dictated by the gentlemen present. Arma virumque cano. ‘It is very warm today.’ An imitation of a cock's crowing. An imitation of planing wood. The peculiar click made in urging on a horse. The word ‘whoa.’ These sounds having been written upon the blackboard in the symbols of visible speech, Mr. Clark and Miss Sweet were recalled, and after studying the symbols for a few moments, produced all the sentences and noises as originally given. Such a test as this, while exhibiting satisfactorily the strange power possessed by visible speech, of communicating any pronunciation without the aid of hearing, also conclusively shows that Mr. Clark and Miss Sweet have acquired a prac-

tical knowledge of the symbols. The interest they have shown in this invention, and the persevering efforts they have made to master all the details, have been very gratifying to me, and I feel perfect confidence in entrusting the system to their care.”\*

Instruction in Mr. Bell's method has been given during six months, and the following letter, in answer to one asking for information, has been received from Miss Sweet, giving some idea of the progress made in her classes. An opportunity of witnessing the good results was also given during a recent visit to that noble charity, which has been hallowed by the memories of the many distinguished philanthropists who have devoted their lives to the instruction of the deaf mute. The letter is dated American Asylum, Hartford, Conn., Nov. 23, 1872:

“I have fourteen† pupils who leave their school-rooms daily and come to me at different hours to be taught articulation. These pupils are in various stages of progress. Six are semi-mutes, who talk so as to be readily understood by any one, and can themselves understand me well, by reading from my lips. The others are congenital mutes, and those who lost their hearing before language was learned. You ask the number of sounds acquired. The six first mentioned could speak when they entered the class. In several cases nasality and harshness of voice have been removed, and many imperfections in articulation have been corrected. Great pains are taken to improve their knowledge of lip-reading. As to the congenital mutes, a part of them can give all the English sounds, both separately, and in many different combinations. Those who have more recently begun the study, and have not yet reached this point, will soon do so. Two of the original class were dropped; not that it was an impossibility to teach them, but they lacked application, and it was thought that the time could be better spent on others. We have another class taught by another teacher.”

The following is an extract from a letter written by Miss Harriet B. Rogers, dated Clarke Institution for Deaf Mutes, Round Hill, Northampton, Mass., Dec. 20, 1872:—

“All our pupils, fifty-six in number, are made to understand and read the symbols of ‘visible speech,’ but only two classes have used it from the time of entering the institution, as we introduced it into our school only in September, 1871. There were five pupils in last year's class. One of them, a little girl of ten years, acquired

twenty-seven out of the thirty-seven English elements during the forty weeks' term; also a great variety of combinations, and learned considerable about inflection. Now she lacks but four elements—*e*, *a*, *sh*, and initial *y*. A boy in the same class during the first year learned all the elements which *she* now has, and has this term acquired the four he lacked the first year. Another boy in the class lacked, at the close of the year, twelve elements, but now lacks only four—*k*, *g*, *o*, *ou*. His greatest difficulty is with combinations. He has not nearly as good control over his tongue as the first two mentioned.

“Of the eleven pupils in this year's class, a little girl of six years has acquired twenty-one of the elements, and can speak about one hundred and fifty words composed of these; also many combinations not forming words. She gives high, low, and medium pitch, and inflects the voice from any one pitch to each of the others. A boy in the same class, ten years old, has acquired nineteen of the elements, and speaks about two hundred words, beside many combinations not forming words. He gives only high and low pitch. His voice at first was *entirely* nasal, but has improved very much.

“The cases cited are those of totally deaf children, who did not speak when they entered school and had received no previous instruction.

“Another boy in this year's class, whose father had attempted to give him some instruction, has a little hearing, spoke some words indistinctly, and had six of the elements when he came here. He has gained twelve elements, and is less advanced in combinations than those just cited. His hearing has not yet been of advantage to him. Since writing the above the new class has acquired two more vowel sounds.

“We have dropped no pupils who have begun this work. I can give you no definite idea of semi-mutes.

“I feel that I have answered your questions very imperfectly, but it is almost impossible to put such things on paper. We would be very glad to show you our school if ever you come to Massachusetts.”

Many, even of my medical readers, may not be aware of the large number of “deaf-mutes” in the United States. By a reference to the author's work, p. 470, it will be found that the number is over sixteen thousand. The reports of various deaf and dumb institutions complain that the United States census is inaccurate, and state that many mutes are known to have been overlooked and omitted in the list. In 1870 there were one thousand, six hundred and fifty-four deaf-mutes in New England, which includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut. In our own State there are some seventeen

\* Hartford Courant, June 28, 1872.

† From Prof. Stone's Report, dated May, 1872, it is stated that “Instruction in articulation and lip-reading has been given, as in previous years, to twenty-five pupils, nearly all of whom were semi-mutes. They have been divided into classes of from three to six and eight, and have been taught about thirty minutes a day.”

hundred cases, and the number is increasing every year at the rate of about 80; this is often from a want of the knowledge in physicians to prevent it. They neglect to treat catarrhs of the tympanum, which, as we have stated in our work, and in other places, arise in the course of the exanthemata, more especially in scarlatina, and owing to neglect of the ears, the young child becomes profoundly deaf, and consequently dumb, from not hearing the voice, there being serious morbid changes at, or following the attack; if attention, as I have before stated, was given to washing out the pus with a mild astringent or detergent in cases of acute perforation, much good would follow. In the other class of cases, in which the membrana tympani resists the pressure of this pus, and the pent-up matter cannot make its escape, the life of the child can be saved by puncturing the membrana by a delicate cataract needle, or knife, at its most *dependent* point. For the diagnostic marks upon this membrane, and details of the operation, we would refer our readers to the article in the author's work, p. 179, entitled *paracentesis of the membrana tympani*. These two terminations are both favorable if the operation is in time to save the brain, for at other times the restlessness and pain in the ears are followed by symptoms of grave cerebral disturbance, such as vomiting, convulsions, coma and death. Still there is another form or termination of this disease; it is in cases in which the patient recovers with the hearing more or less impaired, and the tympanic secretion becomes more or less inspissated or organized. Bands of lymph form bridges by which the bones of the ear become fixed or ankylosed, more especially the base of the stapes which acts upon the oval window, and prevents action upon the nerves of the ear. In this stage, if the matters are soft there is the peculiar color and curvature of the membrana tympani to guide us so as to operate for the removal of these deposits. This is done by perforation, afterwards washing them out and the use of Politzer's air douche, as given at pp. 238--46; the child may thus retain enough hearing to prevent it from becoming

mute. Another matter physicians should endeavor to convey sound instruction upon, is the great disadvantage of marriages of consanguinity, for sad proofs have been given that the offspring of such are often deaf and dumb; for of sixty-five families in the records of the Pennsylvania Institution (from which, during the year 1871, sixty-seven pupils were received) seventeen contain each more than one deaf-mute child; eleven families contain each two, two families each three, and three families contain each four deaf-mutes. In most of these instances the parents were first or second cousins.

I would, therefore, most earnestly suggest that physicians all over our extended country would use their influence among their patients who have deaf-mute children, that they should have the opportunity given them of acquiring articulation, even if it be for no other purpose than as a most valuable physical and vocal exercise, tending, as Mr. Bell has expressed it, to develop and strengthen the lungs. At p. 404 of the author's work is given the 33 (now 36 in number) Institutions for the instruction of the deaf-mutes in the United States, and only forty-three hundred and twenty (4320) are under tuition; there must be many others of suitable age that should be receiving the great blessing of an education, for of the whole number of mute children at school-age in the United States, it is stated there are sixteen thousand two hundred and fifty, and if we include the territories it would give us one hundred and eight more.

We must endeavor to act also upon Legislatures and benevolent men, to found many new institutions all over the length and breadth of the land. Every large city should have a public school like that of Boston, where the mute child, speechless no longer, can go to its parents, after receiving instruction, and enjoy home, no longer an alien among his own people; fitted not only to mix and hold converse with the deaf, but also with the world at large, making, we trust, a more happy being, and in every way better suited to battle with life.

Letter from Mr. Clarke.

Since writing and publishing the above articles in the *MEDICAL AND SURGICAL REPORTER*, we have received another letter on this interesting subject, and as Mr. Clarke is one of the teachers of this department in the "American Asylum," his opinion is of value in regard to the practical working of the system.

"In reply to yours of November 30th, I can only say that it is almost impossible for me to answer the questions you propound. My experience is too limited to warrant me in making any definite statement in regard to 'Visible Speech,' except that I have found it thus far adequate in the attempt to teach articulation to bright pupils.

With regard to obtaining 'natural tones' from semi-mutes I can only say that much depends on the time at which the pupil became deaf, and the degree of hearing that may still remain. A little hearing may make a great difference in the tone.

I do not think any of my pupils can speak in what can justly be called a natural tone. The majority of both semi and congenital mutes can vary the pitch of the voice so as to give chest and head tones, and some can glide from one to the other very well.

Some of the pupils have done very well, but none have surprised me by doing more than the labor spent on them entitled me to expect.

I cannot conceive of any considerable success being obtained in teaching articulation without the use of 'Visible Speech.'"

HARTFORD, Dec. 26, 1872.

Some kind friend has also sent two pamphlets, published by Mr. Bell, to which we would refer those interested in the system of "Visible Speech."\*

\*"Establishment for the study of Vocal Physiology, conducted by Alexander G. Bell, 35 West Newton Street, Mass." "On the Nature and Uses of Visible Speech, by A. G. Bell, with a list of works appended." Boston; Rand, Avery & Co. 1872.



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