Speech and its defects : considered physiologically, pathologically, historically, and remedially / by Samuel O.L. Potter.

Speech, and Its Defects

Samuel O. L. Potter, M.D.

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CONSIDERED

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BY

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AUTHOR OF "AN INDEX OF COMPARATIVE THERAPEUTICS," "A QUIZ-COMPEND OF ANATOMY," "A QUIZ-COMPEND OF MATERIA MEDICA AND THERAPEUTICS."

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PREFACE.

Under the title "Dyslalia—A Study of Speech and its Defects"—this essay was submitted in competition for the first prize at the fifty-seventh annual commencement of the Jefferson Medical College, Philadelphia; and received therefor the unanimous vote of the Faculty. So high a compliment from the most eminent medical Faculty on the American continent, has encouraged the author to hope that his presentment of a neglected subject may be found worthy of the attention of the medical profession, and of assistance to all parents, guardians, and teachers of children afflicted with any form of speech defect.

S. O. L. P.

PHILADELPHIA, 1882.

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SPEECH AND ITS DEFECTS.

"*Τοῦτ' 'εν ψυχῇ λόγοι, ὅπερ κάλλος ἐν σώματι*—Language is to the mind what beauty is to the body."—ARISTIDES.

"Stammering is the inability of articulating a certain letter, lisping is the omission of some letter or syllable, and stuttering is the inability of joining one syllable with another. All these arise from debility, for the tongue is not obedient to the will."—ARISTOTLE.

"And they bring unto him one that was deaf and had an impediment in his speech, . . . And straightway his ears were opened, and the bond of his tongue was loosed, and he spake plain."—ST. MARK vii, 32–35.

INTRODUCTION.

The question of speech impediments has not received the attention it deserves from the medical profession, during the past quarter of a century. In the specialist mania which has seized upon physicians as knowledge has advanced, but few of the "ills that flesh is heir to" have remained under the care of the general practitioner, or "family physician" as he was wont to be affectionately designated. The exanthemata and obstetrics may be said to constitute his practice now-a-days, that is to say, when the modern midwife permits him to manage his cases of labor.

In this division of knowledge and work, the breadth of education, formerly the proud possession of a professional man, is in much danger, and is frequently entirely neglected; students being trained to become ophthalmologists, otologists, gynecologists, laryngologists, dermatologists, neurologists, orthopedists, etc., all but

ignoring the other branches of the *ars medendi*. In the race between the specialists, the treatment of venereal diseases and speech disorders has been given over to charlatans; or in the latter case, what is nearly as bad, to semi-professional empirics, who as self-styled "professors" conduct various "institutes," each claiming to be the possessor of a peculiar method, productive of better results than the system of any other institute.

The ignorance of this subject which prevails among those having the care of children, is productive of much distress, and serious results to the innocent sufferers. The child who manifests a disposition to stutter is usually abused in more ways than one. The affection is intensified by any cause which disturbs the equipoise of the nervous system; and the most frequent and potent causes of this kind are derived from the reception his infirmity receives from those who are endowed with perfect speech themselves. Mockery on the part of companions, and threats, even blows from parents and teachers, have made more confirmed stutterers than any other extrinsic influence, besides making the life of the patient one of unutterable wretchedness. He is told that he is giving way to a "habit" which he can control by his volition, and the inability to do so is regarded as an evidence of an especially evil nature. In many instances he is gravely irrformed that his infirmity is a punishment sent by God for his wicked imitation of some stuttering relative, and yet is daily urged, by Solomon's method, to throw off the divine infliction. Perhaps his recitations are conducted under

the stern eye and sterner hand of a tyrannical teacher, who forces him to repeat the most difficult words under pain of physical punishment; thus exciting those twin factors, mental expectancy and fear, which intensify and soon render automatic an affection which could have been eradicated in its incipiency by the simplest measures.

To the mocking class we might apply the term "thoughtless;" but those above described can be only named "fools." This is no fancy picture. Many a time has even a father been seen to stand over his stammering boy, stick in hand, watching for an opportunity to pay homage to the Jewish king, by striking his child at every repetition of a spasm which was induced by the very presence of his tyrannical and ignorant parent; who himself should have been publicly flogged through the community, for so cruelly outraging his own child. Canon Kingsley, himself a stutterer, truly said that "anything like fear of bodily punishment, or even capriciousness in his teacher's temper and rules, will surely confirm the bad habit; . . . . if he is by any means kept in a state of terror, shame, or even anxiety, then his stammer will grow worse and worse, as he grows older." Fathers of stuttering boys should write these words in letters of gold, and keep them before their eyes. Mothers know the truth by intuition; their hearts teach them that it is sympathy, not blows, that the sufferer needs, and the one in a household thus afflicted will be usually found to be his mother's favorite, and to speak with much less difficulty in her presence, for he need fear no mockery, no threats, no punishment from her.

May not this be the reason, never before pointed out, why female children are so seldom afflicted with stuttering? Coën places the proportion as but one and a half per centum of the whole number affected, while Itard, Astrié, and Rullier even doubted the existence of female stutterers. The celebrated Dr. Graves, of Dublin, in his clinical lectures, mentions one family in which, for three generations, nearly all the males were stammerers, while not one of the females suffered from any defect of speech. If it be a nervous affection, allied to chorea, as many teach, the female should be the sex most subject to it. Yet the contrary is the fact by an overwhelming proportion, and my own belief is that the exemption of girls is wholly due to their being continually under maternal instead of paternal influence.

How often, it may be asked, does the family physician interpose his advice and influence to save the child from the inevitable results of such treatment? For answer, appeal may be taken to the experience of stutterers; and very few will be found to thank the medical profession for any benefits received. Yet speech is a combination of physiological processes, its defects are abnormalities of these processes; and it would seem that no one in a community should be better qualified to advise concerning their treatment, than the medical practitioner. But the standard medical text-books either ignore the subject altogether (Hammond), or formally relegate it (Rosenthal) to the care of specialists. The medical student has almost no opportunity of studying a disorder from which over 200,000 persons suffer

in the United States alone. An affection which has become so entwined around every part of our social life deserves the careful attention of every practitioner.

Believing it to be the duty of every one, who in this age writes on any medical subject, to choose such a one as will permit of his contributing something of value to the general fund of knowledge, I have selected this of speech-defects, as one concerning which, from my own sufferings and experience, I feel somewhat qualified to write; having made, in my own person, practical trial of several of the recognized methods of cure, and having examined all the attainable literature on the subject. I approach it, however, with much diffidence, before this faculty, from the fact that one of its most honored members, Professor J. Aitken Meigs, is understood to have made an especial study of speech disorders just before his death, with the view of writing an elaborate treatise thereon. I cannot hope that mine should be the hand to do what death forbade his doing.

In the following pages the functions of voice and speech will be briefly considered in their physiological relations; the various speech-defects will be described, and a short review given of the opinions and methods of the past thereon; concluding with the subject of DYSLALIA (stammering or stuttering) considered from the standpoint of the writer's experience of his own and several other cases which have come under his observation.

PHONATION.

Voice is the basis of speech, and is possessed by man in common with most of the higher animals; while articulation, as a physical fact, is exhibited by but few, as the parrot, jackdaw, seal, sheep, and dog. The production of voice has been the subject of speculation since the time of Hippocrates. Gradually, through the theories of Aristotle, Galen, Fabricius, Mercenni, Dodart, Avici, Dutrochet, Liscovius, St. Hilaire, Savart; and the experiments of Magendie, Malgaigne, Lehfeldt, Müller, Garcia, Czermak, and Seiler, the last three by the use of the laryngoscope, the present views have crystallized, though not without dispute. Merkel of Leipzig taught lately that the alternate rarefaction and condensation of the air-column *below* the vocal chords gives rise to voice. The accepted view ascribes its production to the vibrations of the column of air contained in the laryngeal, pharyngeal, nasal and buccal cavities, these vibrations being excited by the action of the vocal chords, which themselves are thrown into vibration by the blast of air driven from the lungs by the movements concerned in expiration.

Distinctions. In vocal, as in other sounds, the following distinctions are made, viz:—

Intensity,—depending on the force of the originating blast and the consequent amplitude of the sound-waves.

Pitch,—due to the variations in length and tension of the vocal chords; the former being constant for any particular age, the latter variable at will. These varia-

tions give rise to the different degrees of rapidity with which the waves follow each other, from 33 vibrations in a second for the lowest C to 4224 in the same time for the highest C of the piano.

Range,—depending on the length of the vocal chords, as well as the size of the larynx; to both of which combined are due the voices peculiar to the child, the soprano, contralto, tenor and bass.

Quality (*timbre*),—due to the number and character of the overtones, which, as Helmholtz has proved, accompany every fundamental note; waves, as it were, in the wave of the predominating tone.

Expression.—The emotions confer on voice what may be called, for want of a better term, "soul character." This attribute can no more be described or analyzed, than anger can be measured by weight, or a mother's love by cubic inches.

Again, we distinguish between—

Chest-voice, used in speaking, the most natural voice, produced without any artificial division of the resonance cavities.

Head-voice, in which the naso-pharyngeal space reinforces the resonance, and the posterior edges of the vocal chords are closely approximated.

Falsetto-voice, the most natural voice of the soprano, and not yet clearly understood. The laryngoscope shows the vocal chords wide apart during the emission of these notes, and Madame Seiler concludes that the very edges of these chords only are in vibration. It is thought by some that falsetto tones are produced by stopping the

action of the vocal chords by means of the thyro-arytenoideus internus muscle; by others, that the false vocal chords with the ventricles of Morgagni are chiefly concerned in their production. It is probable that the chief difference between this register and the chest-voice is to be sought for in the tension of the vocal chords, and the extent of their vibrating portions.

The vocal organs may be classified as follows:—

ORGANS OF VOICE AND SPEECH.

- Generating Sound.
  - Motor.
    - Muscles of Respiration.
      - *Ordinary.*
        - Diaphragm.
        - Intercostals.
        - Levators.
        - Scaleni.
      - *Extraordinary.*
        - Serrati magni.
        - Latiss. dorsi.
        - Pectorals.
    - Thorax.
    - Lungs.
    - Bronchi.
    - Trachea.
  - Vibratile.
    - Larynx and its muscles.
    - Vocal chords.
- Modifying Sound.
  - Resonant. (vowel-forming)
    - Vestibule of larynx.
    - Ventricles of larynx.
    - Pharynx.
    - Oral cavity.
    - Nasal cavity.
    - Frontal sinus.
    - Sphenoidal sinus.
    - Epiglottis.
    - Velum palati.
    - Inferior maxillary bone.
  - Articulating. (consonant-forming)
    - Tongue.
    - Lips.
    - Velum palati.
    - Teeth.
    - Inferior maxillary bone.

The Larynx, with its contained apparatus, is denom-

inated the essential organ of voice. Omitting its anatomical description, we may pass to the consideration of those constituent parts which are chiefly concerned in phonation; not, however, without the interesting statement that the larynx has frequently been removed for cancer, etc., and replaced by an artificial vocal apparatus, by which speech was restored. Dr. Wegner of Berlin lately reported two such cases to the Society of German Surgeons.

The Vocal Chords are a pair of membranous reeds, attached anteriorly to the thyroid cartilage, and posteriorly to the processus vocales of the arytenoid cartilages, forming the rima, or chink of the glottis between the chords, and the rima respiratoria behind their posterior attachment. The actions which occur during every act of phonation are two:—(1) a narrowing or widening of the glottis by the approximation or separation of the chords, (2) the variation in the tension of the chords themselves.

The glottis is narrowed by the action of the compound muscle, Henle's sphincter of the larynx; which is composed of four muscles, the thyro-ary-epiglotticus, the thyro-arytenoideus externus and internus, and the arytenoideus posticus, between all of which there is distinct muscular continuity; and each of which, except the latter, has, when exercised alone, the same effect as the combined muscle, namely to close the glottis. Moreover the crico-arytenoidei laterales aid the others by drawing the outer angles of the arytenoid cartilages forwards, thus turning the processus vocales inwards. By

the action of these muscles the arytenoid cartilages are revolved and approximated, the crico-thyroid muscles probably holding them at the same time from being forcibly drawn forwards. By this action the processus vocales are approximated to each other, and necessarily so are the vocal chords, and the glottis is narrowed.

The glottis is widened by the relaxation of the above mentioned muscles, and by the action of the crico-arytenoideus posticus, which separates the processus vocales by causing the arytenoid cartilages to rotate outwards. The arytenoideus posticus, acting alone, produces a similar result.

The vocal chords are stretched by the action of the crico-thyroideus, which increases the distance between their anterior and posterior attachments by drawing the thyroid cartilage downwards and forwards, rotating it about an axis passing through the crico-thyroid joints, the arytenoids being fixed by the arytenoideus, and the crico-arytenoideus posticus. This is the received doctrine, but it is disputed by those who deny that any longitudinal tension of the vocal chords is produced during phonation by muscular action, for the reason that this requires the acknowledgment of an impossibility, namely the stretching and contraction of the thyro-arytenoids at the same moment. Schech teaches that the tension of the chords is produced by the rotation of the cricoid cartilage, its posterior portion moving backwards and downwards, affecting also the arytenoids, which rest upon it, and thus causing the longitudinal tension of the chords.

The vocal chords are relaxed by the sphincter group, but particularly by the thyro-arytenoideus internus and externus, which, by drawing the thyroid upwards and backwards, lessen the distance between it and the processus vocales.

These muscular movements are extremely delicate in their combinations and wonderfully coördinated, so as to produce the finest shades of variation in pitch.

The extrinsic muscles of the larynx are not idle during the production of voice. They hold the larynx steadily when it would otherwise be shaken by the force of the expiratory blast. They raise and lower the larynx, and modify the form of the vocal tube for its varied uses in resonance and articulation.

The ventricles of the larynx are very large in some animals, as the mycetes or howling monkeys, and in them act to increase the vocal resonance. In man they are however too small for the purpose named, and probably serve to give the vocal chords sufficient breadth.

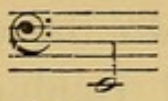
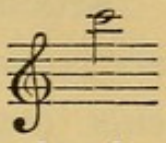
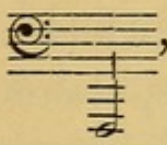
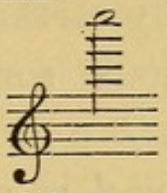
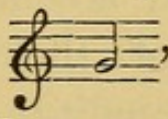
The ventricular bands, or false vocal chords, are merely the upper edges of the ventricles and have been supposed to limit the vibrations of the vocal reeds in the production of falsetto notes, Mandl having observed that during the emission of such notes they descended upon the vocal chords. They are, however, generally considered to be chiefly used in closing the larynx against the passage of foreign bodies, and during the acts of deglutition, coughing, and holding the breath.

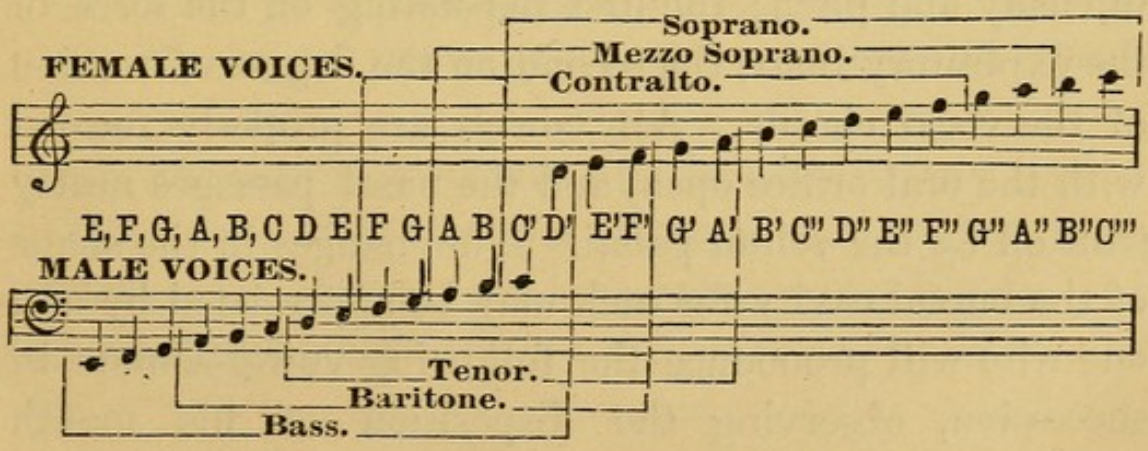
The epiglottis is very variable as to size and shape in different subjects; and during vocalization its form and

position are much altered, being connected so closely with the ever mobile tongue. It has been supposed to have some influence over the production of falsetto notes, the tremulo, etc., and in guiding the waves of sound as they leave the larynx; but the best authorities agree that its function is purely that of a guard-valve to the larynx during deglutition.

The resonance apparatus is contained in a vocal tube, situated above the larynx, and formed by the pharyngeal, oral, and nasal cavities; the velum palati acting like a switch, to modify the tones by admitting more or less of the sound waves into the nasal cavities, or in directing their course to the great resonator, the arch of the hard palate. The antrum, and the frontal and sphenoidal sinuses have also a large share in resonance production, reinforcing the vibrations from the arch of the palate, though to what extent has not been determined. The pharynx is capable of considerable alteration in capacity, and thereby permits of the extrinsic movements of the larynx. The nasal cavities give increased intensity to certain overtones, and when these predominate over the fundamental note, the disagreeable "nasal twang" is produced. The mouth forms the principal resonance chamber, its overtones being those which are most harmonious with the fundamental tone, while the constant change in its shape and capacity, due to the facile motions of the tongue and lips, give rise to an agreeable diversity of voice-quality (timbre); and, as will hereafter be seen, constitutes the essential organ of articulation.

COMPASS OF THE VOICE.

The compass, or range of the voice, includes about four octaves, namely from E  to C‴  the lowest requiring 80 vibrations per second, the highest 1024. Individual voices have descended to F,  , while Catalini sang G‴  and Aguiari is said by Mozart to have risen to C⁗  ; these last two notes, of course, being in the falsetto range, which is usually considered by the singing masters as commencing about G′  , though physiologically it should be considered as movable in proportion to the range of each individual voice. The compass and classification of ordinary voices are generally described as follows, although in every community may be found individuals presenting marked exceptions to the rule.



ARTICULATION.

Articulation is the method by which voice-sounds are converted into the elements of speech. This process consists of combined and successive muscular movements of great complexity, which by altering the shape and capacity of the vocal tube and its outlets, form those combinations of sound which are represented in written language by letters, and which are generally arranged in the two great classes, *vowels* or continuous sounds, and *consonants*, or interrupted sounds.

A vowel is a continuous voice-sound, formed by a fundamental tone from the vibrations produced by the vocal chords, and certain accompanying overtones, the respective prominence of the latter giving to each vowel its characteristic quality. The differing prominence of certain overtones is produced by the changing shape of the oral and pharyngeal passages, each vowel requiring its own peculiar disposition of these parts. Every vowel, besides its peculiar combination of overtones (timbre), which is constant, has many varieties of intensity and pitch; the first depending on the force of the expiratory blast, the second on the degree of tension of the vocal chords. All vowels are properly formed with the oral orifice open, and the nasal passages nearly shut off by the velum palati. The changes in the shape of the buccal cavity for each may be appreciated by any one who will pronounce the following vowel-sounds in succession, observing the disposition of his mouth

during the pronunciation of each one; thus:—*ee*, *ay*, *ah*, *aw*, *oh*, *oo*.

In pronouncing the first (*ee*) the vocal tube is shortest, the larynx being raised, and the lips retracted. For each of the succeeding the relative positions of the larynx, tongue and lips are changed, until in the last (*oo*) the larynx and lips are as far apart as possible, the former being depressed, and the latter protruded.

The subject of vowel-sounds was studied by Kratzenstein (1780), Kempelen (1781), Willis (1828), Wheatstone (1837), Donders (1857), and many others of less note; but it is to Helmholtz, the Newton of acoustics, that we are indebted for the clear views now held regarding their nature, and the mechanism of their production.

Consonants, as their name implies, are not individual vocal sounds; and can only be sounded in combination with vowels. They are interruptions or modifications of the voice-current, as it passes through the vocal tube; and are each tuned, as it were, to the characteristic quality (timbre) of some vowel. The interruption may be made by approximating,—

(1) The lips to each other or to the teeth.

(2) The tip of the tongue to the teeth or to the hard palate.

(3) The root of the tongue to the soft palate.

Those formed in the first manner are called *labials;* in the second, *dentals* (more properly *palatals*); and in the third, *gutturals.*

Consonants may also be classified from the acoustic stand-point, as follows:—

(1) *Explosives,*—formed by the sudden establishment or removal of the interruptions, causing a burst of enunciation.

(2) *Aspirates,*—formed by the breath rushing through the constricted vocal tube.

(3) *Resonants,*—formed by directing the current of voice through the nasal passages, the mouth being closed and acting as a resonance chamber.

(4) *Vibratives,*—formed by the vibration of certain parts of the passage, constituting a series of short explosions.

A third classification is formed by dividing the consonants into *voiced* and *breathed,* the latter having but a faint wind-rush, while the former are based on distinct vowel-sounds. This difference is only recognized by prolonging their sounds. For example, take S and Z; though formed in precisely the same manner, prolongation of their individual sounds shows that the former consists solely of a hiss, while the latter has a base of audible laryngeal vibration. In the Gaelic, Welsh, and German languages these two divisions are used indiscriminately, one set being employed for the other, and *vice versa.*

The following tabular arrangement of the consonants represents each of the foregoing classifications, the voiced consonants being italicized, and arranged, each alongside its corresponding breathed one.

	LABIALS.	DENTALS.	GUTTURALS.
Explosives.	P, *B.*	T, *D.*	K, *G.*
Aspirates.	F, *V.*	S, *Z*, L, *L*, Sh, *J*, Th (hard) *Th* (soft.)	Ch, *Y* (initial).
Resonants.	*M.*	*N*	*Ng.*
Vibratives.		R	R.

NOTE.—*L* is formed by the air escaping over the sides of the tongue, which closes the oral orifice by the approximation of its tip to the hard palate. In sounding *Th* the tongue is placed between the teeth, which are partially separated. In *M* the oral opening is closed by the lips, in *N* by the teeth, while in *Ng* the stoppage occurs at the fauces, by the approximation of the back of the tongue to the soft palate. *H* is a breathed aspirate, formed by a rush of breath through the open glottis. When vocalized, it is the *spiritus asper* or *spiritus lenis*, according as the change in position of the vocal chords is made suddenly as the vowel is pronounced, or previous to its pronunciation. The Arabic *H* is formed by the breath passing through the rima respiratoria, the rima glottidis being closed. *C* has the sounds of S and K. *Q* has the same sound as K, and is always followed by a *u*. *X* has the sound of Ks, when at the end of a syllable; and that of Z when an initial letter. *Sh* is a breathed J. *M* is the mother consonant, and the first one learned, next in order in this respect coming the explosives.

Whispering is voiceless speech, the vocal chords not being approximated sufficiently to permit of their vibration. Its base is a toneless flutter, the consonants being formed by the use of the lips and tongue, as in speaking.

SPEECH.

This faculty may be defined as the power of combining articulate sounds, so as to convey ideas from one person to another. Singing requires precision of action of the respiratory and laryngeal muscles especially; speech requires in addition a nearly equal precision of action of the numerous muscles of articulation. The complexity of these combined movements is very great, producing a wonderful variety of combination in muscular action; as every distinct sound requires its own

peculiar arrangement of the numerous parts concerned in its production. The actual number of individual language-sounds is not great, less than 50 only being evolved from the English and some five other languages. But the infinite variety of combination which these fifty sounds may undergo, requires the organs of speech to pass from any one position to another with the most perfect accuracy and smoothness. Only by such precision of function can speech-elements (syllables) be properly constructed.

The nervous apparatus which connects and controls these numerous muscles, joining them to the higher brain, and rendering their combined action perfectly obedient to the will, is the most admirable of all the parts concerned. Vast as it is complicated, it consists of nervous tracts and ganglionic centres, partly located in the very seat of the conscious intelligence, and partly consisting of reflex agencies wherein sensory stimuli are converted into motion. There is no single "speech-centre" in the brain, any more than there is a soul-centre; though a long series of observations upon the morbid anatomy of cases presenting loss or defects of speech, has proved the existence in the brain of different centres for the production of the various processes which find their expression in articulate and written language.

A high ideational centre, which has not been localized, governs the intellectual operations concerned in speech; and therein arise the conceptions which become expressed in language and in music. To this centre

converge impressions from the perceptive centres for sight and hearing; and from it descend the ideational irradiations to Broca's centre, where the exact combinations of words to be used are determined. The latter centre is located in the posterior third of the left third frontal convolution, with, perhaps, the adjoining portion of the second and the island of Reil, and is designated as the especial seat of the motor processes of articulate speech. The same function is also probably shared by the corresponding part of the right brain, but is in abeyance; an apparent anomaly which is explained by Broca as due to the almost universal choice of the left hemisphere by man for the direction of his most delicate work. This region is closely connected with that part of the corona radiata which springs from the corpus striatum; and from it the impulses descend to the latter body, where those influences are put forth which call into operation the combinations of motor processes resulting in speech.

In the same region of the cerebral surface and close to Broca's centre, Ferrier locates the centres for the different processes of motion used in language, and for the special senses. The perceptive visual centre in the supra-marginal convolution and the pli courbe;—the perceptive acoustic centre in the first temporo-sphenoidal convolution;—centres for special movements of the tongue and lips in the third frontal;—above and behind these, centres for elevation, depression, and retraction of the mouth;—and in the ascending parietal convolution centres for the movements of the hands in

written language. Anatomically all these motor areas are closely related to the motor region of the corona radiata; as are also the sensory areas related to the upward termination of the sensory tract; and both motor and sensory areas are placed closely together, admitting of easy intercommunication, and are all supplied by the middle cerebral artery, and liable therefore to common implication from any obstruction of that vessel.

In the medulla oblongata is located the centre which presides over the coördination of the movements concerned,—the basal phonic centre. Herein and in the corpora striata (especially the left corpus) are contained the nervous apparatus required for the accurate mechanical execution of the movements concerned in voice and speech. For phonation this apparatus produces and controls the motor processes through the channels afforded by the fibres of the spinal accessory nerve which are bound up in the trunk of the pneumogastric. The superior laryngeal nerve supplies the mucous membrane of the larynx, and contains the motor fibres distributed to the crico-thyroid muscle; which, as the most important muscle of the larynx, has a separate nervous supply, the recurrent laryngeal supplying all the others. For articulation the motor processes are regulated by the facial and hypoglossal nerves, and perhaps by the motor fibres of the glosso-pharyngeal.

All these nerves have their origin from the same region in the gray matter of the medulla oblongata, and implication of their fibres, in any disease or injury of

this location, produces the affection known as glosso-labio-laryngeal paralysis.

DEFECTS OF SPEECH.

Nomenclature. The classification of speech-defects presents great confusion. Authors who have elaborated their ideas on the subject have had as many varieties of designation as they have had theories, and among the later writers an equal variety of nomenclature is met with. For example, Kussmaul designates their principal divisions Dysarthria and Dyslalia; the former comprising all defects of articulation, the latter those which depend upon "gross mechanical defects in the external apparatuses of speech and their motor nerves." He writes of stammering or "dysarthria literalis," and stuttering, or "dysarthria syllabaris;" while under the term "dyslalia" he classifies all those instances of defective utterance of the literal sounds (dyslalia dentalis, dyslalia lingualis, etc.,) which, according to other writers, are comprised in the term "stammering," as lambdacism, rhotacism, sigmatism, etc. Dr. Edward Warren used the term "stammering" for the defect which all modern writers call "stuttering." Nearly all the English writers, with our own Worcester, Webster, and Hammond, use the terms "stuttering" and "stammering" as synonymous. Many American specialists, as Butterfield, Bell, etc., apply the latter term to that form of stuttering in which occurs a spasmodic contraction of the articulating muscles, without repeated utter-

ance of the same sound. It is believed that the following original scheme in a measure reconciles the apparent contradictions of description and nomenclature, which exist not only in common language, but also in the special treatises on the subject. Temporary disorders of speech, as well as aphonia and similar affections, are not included in this arrangement.

Alalia,
- *Psychical,* — due to cerebral lesions, or disorder of the ideational centre, producing aphasia, etc.,
- *Paralytic,* — due to lesions of the medulla oblongata, or disordered motor centres, producing glosso-labio-laryngeal paralysis.

Paralalia,* defective speech, vicious pronunciation; the so-called "stammering" of many writers.
- Lalling.
- Blæsitas.
- Gammacism.
- Iotacism.
- Nasalizing (Rhinism).
- Palatining.
- Rhotacism (Burring.)
- Lambdacism.
- Sigmatism (Lisping.)
- etc.,

Dyslalia:—*Stuttering.*—difficult, interrupted speech.
- (1) *Spasmodic Hesitation*, characterized by a slight choking, and impeded action of the respiratory apparatus.
- (2) *Clonic Spasm of Articulation*—the "Stuttering" of the writers,—characterized by the repeated utterance of one sound before the next can be emitted.
- (3) *Tonoid Spasm of Articulation*—called "Stammering" in common parlance: a temporary inability to articulate, the organs being tightly held together.

* A more exact term might have been used, *e.g. heterolalia*, *metalalia* or *pseudolalia*, but I preferred the above, because its use in this sense is sanctioned by a standard medical dictionary, Dunglison's.

The latter form, Dyslalia, is characterized in each of its divisions, by the presence of spasm; whether the impediment be experienced at the labial, dental, or guttural sounds; whether so slight as to be simply a hesitancy of speech, or exhibiting the *tut-tut-tut-tut* of the stutterer, or the convulsive spasm, entirely stopping the enunciation;—its essential feature is spasm, and all its forms should therefore be grouped under one head. This is especially appropriate from the well-known fact that all three forms are usually and successively exhibited by the same patient.

ALALIA.

The Psychical Defects arising from morbid conditions of the higher centres governing written or spoken language, are usually grouped under the terms *aphasia* and *agraphia*, signifying loss or impairment of the function of language, with their division into *amnesic* and *ataxia* aphasia or agraphia. The terms *paraphrasia* and *paragraphia* represent a state in which wrong or unintelligible words or signs are used as forms of expression. The termination of these affections depends generally on that of the causative malady, but may persist after the removal of the latter. In such cases of persistence, careful speech-training may restore the function entirely; an instance of such a result being related by Dr. Bristowe in his Lumleian lectures for 1879.

The Paralytic Defects of speech due to lesions of the medulla implicating the coördinating centre or the nuclei of origin of the nerves concerned, are chiefly if not almost wholly described in the symptoms of

the disease known as glosso-labio-laryngeal paralysis, which is a progressive disorder, usually accompanied by progressive muscular atrophy, and is not amenable to treatment. It has varieties according to the groups of muscles implicated. The utterance of individual articulate sounds is not at first much impaired, but when combinations thereof are attempted, the indistinctness of utterance becomes very marked. This disease is fully described in the text-books, where its treatment may also be found; hence it will not be further considered here.

Paralytic impairment of articulation attends many other diseases, as posterior spinal sclerosis, multiple (disseminated) sclerosis, general paralysis, cretinism. These are all marked by feeble and indistinct utterance, which becomes worse during excitement. Tremulous lips and tongue, difficulty in beginning words and syllables, leading to a scanning enunciation, with more or less spasmodic action of the facial muscles, and nasal enunciation if the soft palate becomes implicated,—are the principal evidences of implication of the speech in these diseases.

PARALALIA.

The term *paralalia* is not used by the writers on speech-defects, though Dunglison (Med. Dict.) gives to it the meaning in which it is here used.* I have placed it in my nomenclature for the purpose of expressing by a term analogous to the other terms used, a series of defects which are not necessarily difficulties, *i. e.*, do not

* See Note on page 30.

present impeded speech as an essential feature. Such instances of vicious pronunciation are designated *stammering* by Kussmaul, Klencke, Hunt, Rosenthal, Holmes, and many other authorities, to the great confusion of the subject, as the latter term is used by English-speaking people to mean an entirely different affection. In the paralaliæ phonation is not impaired, nor are there any convulsive, spasmodic, or congestive phenomena present, nor any impeded respiration. A failure in the action of certain muscles of articulation occurs, due to some mechanical or central obstacle, or to defects in the muscles themselves, or to disturbed transmission of nervous impulses. It may also be due to enlarged tonsils, cleft palate, short frenum (tongue-tie); or it may arise from an affectation of style, local dialect, carelessness or eagerness in speaking. Its divisions are as follows:—

Lalling,—observed in infants and idiots, is the inability of pronouncing many consonant sounds; the sound of *l* taking the place of the difficult ones.

Lambdacism,—is an inability of pronouncing *l*, for which *r* or *w* is substituted. The Japanese have no *l* in their language.

Blœsitas,—consists of two forms of indistinct pronunciation; one,—in which the hard consonants are softened, using *m*, *b*, or *f*, for *p*; *n* or *d* for *t*; *z* for *s*, etc.; another,—in which the soft consonants become hardened, as by the Welshman in the Merry Wives of Windsor, "ferry goot, I will make a prief of it."

Gammacism,—is the use of other letters, as *t*, or *d*,

instead of *g* and *k;* and is due to a want of mobility of the back part of the tongue.

Iotacism,—in which the consonants *j*, *g* (soft), and *ch*, become *z* or *s*. Its cause is usually the same as that of gammacism.

Rhinism,—the "nasal twang," due to impeded or feeble action of the velum palati, or to obstructed states of the nasal passages.

Uraniscophonia (palatining) especially affects the pronunciation of *k*, which before *a e* and *i* is sounded like *h;* and before *r* and *l* like *t*. It is due to fissure or hole in the palate.

Rhotacism,—or defective pronunciation of *r*, which is the most difficult consonant, its emission requiring the combined efforts of various organs. The Chinese have no such letter, and always use an *l* for it when speaking other languages. It was extremely difficult to Demosthenes, and whole nations in northern Europe have found its enunciation very troublesome. Those who, from real difficulty or affectation, do not pronounce it, replace it by *l*, *g*, *ng*, or *w*. A common defect is the use of the guttural *r* instead of the lingual *r*, the former being produced by the vibration of the uvula, the passage being constricted by the approximation of the back of the tongue to the soft palate; the latter by the vibration of the tip of the tongue against the hard palate. The substitution of *w* for *r* is a type of rhotacism commonly affected by the English snobs, who say "wubber" for "rubber," in imitation of those Roman cockneys at whom Ovid sneered 1900 years ago,—

"Cum legitima fraudatur littera voce,
Blæsaque fit jusso subdola lingua sono?
In vitio decor est, quædam male reddere verba
Discunt posse minus, quam potuere loqui."

ARS. AM. 3, 293.

Sigmatism, or lisping, is due to faulty action of the tongue against the teeth, and comprises various defects in the enunciation of the sibilant sounds *s*, *sh*, *z*, *zh*, etc., which make so large a part of the English language. Its most common form is that in which the sound *th* is used for *s*, and *vice versa*. It is frequently affected by fools; but may be due to an abnormal condition of either the tongue or the teeth.

Action of the Tongue. As has been pointed out in the foregoing description of several forms of defective articulation, the tongue is the offending member in the majority of cases. Hypertrophy of this organ is often the prime cause of defective utterance, as well as adhesions, tumors, and cicatricial or muscular contractions. Yet, strange to say, serious mutilation, or even removal of the tongue, will not necessarily prevent speech, or even render it unintelligible. This is proven by overwhelming testimony from the highest surgical authorities; so that the case related by Gibbon, of those African confessors who retained the faculty of speech after their tongues had been cut out, is not to be considered so much of a miracle as even skeptical Gibbon himself seemed to acknowledge it to be.

Treatment of Paralalia. The patient should be carefully and regularly exercised on the offending sounds,

by reading aloud, repeating the alphabet, or other exercises in pronunciation. The action of the various organs of articulation should be explained to him, and he should be required to place them in their proper positions before enunciating the sounds. The breathing should be regulated, the patient being required to take an inspiration when reading, at every punctuation mark. A short period of the above described treatment will generally eradicate such vices of speech in young persons, older subjects requiring more time and a greater amount of perseverance. In cases due to morbid conditions of the palate, tongue, teeth or lips, these organs may require surgical measures appropriate to each case, such as staphylorraphy, the use of artificial palate-plates, excision of the uvula or tonsils, etc. Rhotacism is best combated by the use of exercises on a word or words in which there is but one *r*, preceded by a *t*, replacing the *r* by *d*, and exercising the patient thereon, until by degrees the rapid combinations of the sounds *t d*, produce the lingual *r*. Such a word as *tremulous* would thus be pronounced, at first, *tdemulous;* but by rapid repetition the *t d* sounds become so connected as to produce the motion of the tongue-tip necessary for the lingual *r*. This method is due to the celebrated French actor, Talma.

In lisping the tongue must be withdrawn from between the teeth; and in the reverse condition, inability to pronounce the sound *th*, the patient should be directed to place his tongue slightly between his teeth.

Many other varieties of paralalia are met with occa-

sionally; but the foregoing include all the most common and the most important ones.

DYSLALIA.

In approaching the most difficult part of the subject under consideration, namely, those defects of speech commonly designated indiscriminately by the terms *stammering* and *stuttering*, it should be borne in mind that speech is the one grand, essential attribute of humanity which distinguishes man from all other animals, and raises him immeasurably above the whole of creation. Any serious defect in this noble function must be considered by the thoughtful philanthropist, as no less than a blot upon nature's masterpiece, one which should be classed with the severest forms of disease, even with those which degrade their victims in the eyes of mankind, while exciting the utmost degree of commiseration. Yet mockery is almost the only treatment which those thus unhappily afflicted have ever received from society; while the legions of fathers, teachers, and quacks have tortured them with the results of the false theories which have always existed concerning the etiology of such perversions of function. Abandoned by the medical profession to the tribe of wandering quacks, self-styled "professors of elocution," and conductors of stutter-schools or "institutes," who vie with each other in surrounding the question with inextricable confusion of theory, and innumerable diversity of practice, no wonder that the stutterer often abandons all hope and despairs of being "a man again." The treatment of stuttering

has almost become a black art. Germany, France, England and America, have each their "institutes" with their "professors," who diligently flood the country with semi-descriptions of their various "methods," loudly proclaiming the eminently "scientific" character of their treatment, and varnished over with the usual certificates of "cures" from grateful patients. The logical value of reported cures, unless the strictest possible requirements are complied with in their observation and recording, is simply nothing; but when they are stated as evidence by the curer or the cured, they become worse than nothing, and should be treated as *prima facie* forgeries or falsehoods in the majority of cases, especially where we do not know that the parties are competent and reliable. Even when every possible care is taken to eliminate every factor of error the result is often far from satisfactory. Cures of disease are on record from the earliest ages, and are established on the same quality of evidence as that on which history itself is built. Since the day when Moses is said to have healed the serpent-bitten Israelites isopathically, to that in which Dr. D'Unger (Moses the younger!) cures another form of "snakes," the best class of evidence is attainable for cures of every disease by every method that human ingenuity or rascality can devise. So in the cases before us! Every month we run across a fresh traveling stutter-doctor who advertises to cure or no pay; and who invariably leaves his dupes minus their money and any permanent advantage from the worn-out trick he has taught them.

The sorrows of stutterers have been known by experience to the most exalted personages. Kings have been thus afflicted;—for example Louis II of France, and Michael II, Emperor of the East, both of whom were surnamed "Le Bégue," meaning "the stammerer," —Louis XIII of France was also a stutterer, and to a very great degree. Marquis de Mauny, and Marshal de Thoiras were stutterers. Priests and statesmen also, as Moses, perhaps the apostle Paul, and certainly the Rev. Canon Kingsley;—as well as orators, like Demosthenes, Curran, and Beaumont;—and physicians, as Warren, Voisin, Palmer, Chégoin, Merkel, Guillaume, D'Alais, Becquerel, Wyneken, Coën, and Hammond, have suffered the "cares and sorrows" which the poet has ascribed to those,—

"Who can think within themselves, and the fire burneth at their heart,
"And eloquence waiteth at their lips, yet they speak not with their tongue,
"Whom need constraineth to ask, or pity sendeth as her messengers,
"But nervous dread and sensitive shame freeze the current of their speech,
"The mouth is sealed as with lead, a cold weight presseth on the heart,
"The mocking promise of power is once more broken in performance,
"And they stand impotent of words, travailing with unborn thoughts.
"Courage is cowed at the portal, wisdom is widowed of utterance,
"He that went to comfort is pitied, he that should rebuke is silent,
"And fools who might listen and learn, stand by to look and to laugh,

"While friends, with kinder eyes, wound deeper by compassion,
"And thought, finding not a vent, smouldereth, gnawing at the heart,
"And the man sinketh in his sphere for lack of empty sounds."
"Oh! 'tis a sore affliction to restrain from mere necessity the glowing thought;
"To feel the fluent cataract of speech, checked by some wintry spell, and frozen up, just as it's leaping from the precipice!
"To be the butt of wordy, captious fools, ...
"'Tis to be mortified in every point, baffled at every turn of life, for want of that most common privilege of man,
"The merest drug of gorged society,—words! windy words!!"

Such truly are some of the experiences known only to the stutterer, who alone can fully appreciate the feeling which prompted Kingsley to say,—"Every stammerer is to me a friend at once, by unity of sorrow:—after all, perhaps the most sacred unity on earth."

PERISCOPE.

The definitions of stuttering, the theories as to its causation, and the methods of treatment, in vogue at different times, though constituting a most interesting chapter in the history of the subject, are now chiefly of value in pointing out the rocks on which others have been wrecked, and in showing the student that perhaps his own theories have been previously enunciated by former investigators, only to take their place in the dust of dead speculation.

As usual in investigations of this kind we must begin with Holy Writ, wherein we will find recorded many instances of defective speech, from Moses, who evidently was afflicted with something of this nature, to

the lisping Ephraimites who were slaughtered at the Jordan, betrayed by their inability to enunciate the *sh.* Isaiah frequently alludes to "stammering lips" and "tongues," and Jesus is said (by Mark) to have cured "one that was deaf and had an impediment in his speech."

No medical investigation is complete without reference to the opinions of Hippocrates, Aristotle, and Galen, each of whom made many observations concerning stuttering, which are more curious than valuable. *Hippocrates** remarked that there existed among stutterers a chronic diarrhœa (not of words), and dilated on the cure of stuttering by varices, the cure resulting in suppurating ulcers. Aristotle's definitions may be found at the head of this essay. He ascribed the whole blame to the tongue, while *Galen* laid it to moisture of the brain and muscular debility from cold; also to various abnormalities of the tongue, for which he suggested cauterization.

Satyrus, the Grecian actor, is said by Plutarch to have been responsible for the cure of Demosthenes, who labored under a weak voice, indistinct speech, and short breath, combined with great violence of manner. The generally received notion that the cure of the great Grecian orator was effected by speaking with pebbles in his mouth, is not borne out by the historical account; for both Demetrius and Cicero tell us that Demosthenes spent months in training his voice, using a looking-glass during his vocal exercises, and applying every power of

* Names of physicians are *in italics.*

his will to the conquering of his speech-defects, the pebbles being but an incidental part of the treatment. Chervin, the modern French specialist in this disorder, grants to Satyrus the glory of being the first to combat stuttering by lessons of diction, and says that modern success has been in proportion to the "nearness of approach to the simple and natural means which antiquity has transmitted to us."

Celsus (A. D. 1–37) describes various means of correcting the faulty action of the tongue: *Ætius* (600), also blaming the tongue, recommended the division of the frenum; *Ægineta* did likewise. *Avicenna* (1000) found the tongue much at fault, but also recognized the existence of speech-defects due to lesions of the brain or nerves, and to spasm of the epiglottis; the latter form he recommended to be treated by a deep inspiration before speaking.

De Chauliac (1336), a celebrated Italian surgeon, ascribed stuttering to convulsions, ulcers or other affections of the tongue, to paralysis, or to moisture of the nerves and muscles. His treatment consisted of embrocations to dessicate the brain, cauteries to the vertebræ, blisters, frictions, and "gargarisms" for the tongue.

Mercurialis (1584), professor at Padua, Bologna, and Pisa, wrote concerning stuttering in his work *De puerorum morbis*, locating its cause in the brain and in the tongue, and giving it two species according as it was produced by abnormal dryness or moisture of those parts. His treatment was similar to De Chauliac's, with the addition of systematic exercise of the voice and the body.

Hildanus (1608) operated on his brother for a defect of speech, by cutting the frenum of the tongue.

Lord Bacon (1627), who wrote on every subject, did not ignore stuttering. His observations regarding its symptoms are very truthful; but his theory of its etiology was that of his day; namely, the coldness and moisture of the tongue, and also, but rarely, its dryness.

Menjot (1674) discriminated between three forms of defective speech, in a very complete treatise on the subject, ascribing them all to some abnormality of the tongue.

Amman (1700), a celebrated educator of deafmutes, who enunciated the first correct views regarding phonation, also treated stutterers. His treatment for all vices of pronunciation, was directed to the tongue chiefly. He recognized two forms of defective speech, Hottentotism and Hesitantia, placing under the latter head all forms of stuttering, which he held to be due simply to vicious habit.

Küstner (1716) blamed the tongue, and directed his treatment almost wholly to it. Hahn (1736) blamed the hyoid bone. Hartley (1749) ascribed the affection to nervous derangement usually, sometimes to imitation, also often to palsy. *Haen* (1760) perceived pulmonary vomicæ at the bottom of the trouble. *Santorini* (1705) placed the cause in the abnormal size of "two holes in the middle region of the palate" (the palatine canals).

Morgagni (1761) rejected this theory, as well as Delius' idea of a double velum, and inclined towards blaming the hyoid bone as the most likely offender.

Sauvages (1770) and Cullen (1750) considered the principal cause to lie in debility. The former recognized seven species of Psellism or stuttering. Moses Mendelssohn (1783) considered that the cause was more psychical than otherwise, and was due to a collision between many ideas flowing simultaneously from the brain. He recommended slow and loud reading, the succeeding words being kept covered, so as not to be seen until they were required to be enunciated. Crichton (1798) described the affection in very graphic language, and was much impressed by the fact that there are but few sounds on which any one person stutters.

Erasmus Darwin (1800) ascribed stuttering to interrupted association of the movements of the organs of speech, caused by sensations or emotions, as awe, bashfulness, etc.; and prescribed constant exercise of the apparatus on the difficult sounds, with as much softening of the initial consonants as possible.

Watson (1809) saw in stuttering the result of a disseverance of the associated action of the muscles, (what we would now call want of coördinating power); and recommended the exercise of the organs of speech, and especially of the will, whereby the "vicious habit," as he calls it, may be overcome.

Thelwall (1812) was a typical stutter-doctor. He elaborated four species of the affection, corresponding to the fancied locations of its cause in the lips, tongue, pharynx, or bronchi; and had his hobby in respect to treatment, namely—rhythm.

Savary (1812) ascribed stuttering chiefly to malformation of the tongue, less often to fear, or to hurried speech.

Itard (1817) believed the disorder to be due to muscular debility, and used a golden or ivory fork, placed in the cavity of the alveolar arch of the lower jaw for the purpose of supporting the tongue. He only reported two cures, neither of which were permanent according to other accounts.

Frank (1818) used an elaborate nomenclature for defects of speech, and enumerated many causes of stuttering, as cerebral lesions, sexual excesses, etc. His treatment consisted wholly of exercises for the voice and speech, under the direction of a teacher of deaf-mutes.

Rullier (1821) placed the cause in a defective relation between the speed of the cerebral irradiations and the consequent muscular movements.

Voisin (1821) had similar views regarding the etiology, and being himself a stutterer, had practical experience to guide him ; yet his only contribution to the treatment was the trick of pressing the thumb against the chin while speaking.

Astrié (1824) also located the cause in some modification of brain action. His treatment combined the study of articulation with recitation, and the use of Itard's fork.

Yates (1825), of New York, was, according to Warren, the real inventor of the system known at the time as the *American Method*, and usually attributed to the

widow Leigh, who was his daughter's governess, and through whom, fearing professional disrepute, he carried on the treatment in an "institute." He believed the cause of the trouble to lie in spasm of the glottis; and yet directed his treatment to raising the tip of the tongue to the palate, and holding it there while speaking. Malebouche bought the secret, made it "scientific," and traded on it, selling it to the Belgian and Prussian governments. It was unfortunate that after an American had originated this precious piece of quackery, he did not profit by it at the expense of the "effete monarchies." That was reserved for Europeans. Bausmann was made a "professor" of the system by the Prussian Ecclesiastical Minister of State. Dr. Zitterland, and M. Charlier were also prominent in its application throughout Europe. It was made the subject of a report by Magendie to the French Academy in 1828; and shortly afterwards died a natural death, after exciting more attention than ever given before or since to anything of the kind. Canon Kingsley states that this method was secretly peddled by an English quack many years before; so that it was not entitled even to the merit of originality.

Combe (1827) believed that the cause lay in irregular nervous action. He recommended patient and persistent exercise of the vocal muscles, with attention to diet and hygiene, and cheerful society, kind treatment, and encouragement.

Broster (1827) was a Scotch stutter-quack, who practiced in London, and wrote a book on his method, but

kept it as much in the dark as possible. His system is stated by Dr. Julius, in the *Magazine of Foreign Medical Literature*, vol. xv, to have been nothing but Mrs. Leigh's trick.

Bertrand (1828), in the French Academy discussion on Magendie's report, pronounced stuttering to be a spasmodic nervous affection, curable by any method which will distract the attention of the patient from his speech. He prophesied the downfall of the Leigh method as soon as it lost the secrecy which surrounded it.

McCormac (1828) announced with the most arrogant confidence a curative method by using deep inspirations and forcible expirations, which he claimed would act with "unerring" certainty in the most severe cases. He placed the cause of stuttering in speaking with nearly emptied lungs.

Arnott (1829) located the cause in spasm of the glottis, and to keep the glottis constantly open recommended the use of a continuous *e*-sound between each word. *Müller* (1857) agreed with Dr. Arnott as to the cause, but advised the entire omission of explosive sounds in reading exercises, so as to keep the glottis open. The combined recommendations of Arnott and Müller have been lately brought forward by a writer in Chambers' Journal (Nov. 1, 1880) who gives minute directions for following the method. This will be referred to again under the heading *Treatment*.

Deleau (1829) distinguished between the habit of vicious pronunciation, the stammering due to organic

lesions, and three species of stuttering (bégaiement);—one due to the faulty action of the tongue, a second characterized by spasmodic closure of the lips; and a third in which spasm of the glottis takes place. The general cause of stuttering he assigned to an infirm will, incomplete cerebral action, or deficient innervation. His treatment consisted wholly in educating the vocal and articulating organs, not by aid of the ear, but by sight, so as to secure their being placed in the right position for each sound enunciated.

Palmer (1829), himself a stutterer, divided speech-defects into two classes, organic and functional; the latter being chiefly due to irregular muscular action, which being established from habit, becomes independent of the original cause and closely resembles chorea in its nature and phenomena. His treatment was one of moral discipline, with varied details for each case.

Chégoin (1830) endeavored to examine the question in his own person before a mirror; and naturally located the difficulty in the tongue, which he held was of disproportionate size in such cases. His treatment consisted in mechanical methods of altering the disproportion referred to.

Wutzer (1830), following in the footsteps of Itard and Chégoin, invented a glosso-mochlion (tongue lever) for the purpose of keeping that organ raised out of the fossa behind the inferior incisors.

Serre d'Alais (1829) recognized two species of stuttering; one, a chorea of the muscles concerned in articulation;—the other, a tetanus of the muscles of phona-

tion and respiration. His method comprised the separate forcible pronunciation of every syllable, aided by synchronous movements of the arms in severe cases. He afterwards acknowledged the uselessness of his system, which had failed to cure himself.

Magendie (1830) attributed speech to an "organic intelligence" (instinct), and stuttering to a want of this intelligence. He believed that will-power could replace the want sufficiently to bring about a cure in those who were possessed of enough moral force for its exercise.

Schulthess (1830) compared stuttering to a hydrophobic spasm, calling it *phonophobia;* and considered spasm of the glottis to be its chief cause, extending through nerve association, to the other organs of speech. He classified stuttering as idiopathic, symptomatic, and sympathetic; the first being due to want of harmony between nerve-action and that of the muscles;—the second and third, to other existing affections. He first correctly differentiated between vicious speech and stuttering.

Bausmann (1832) instructed patients in the Leigh method under the auspices of the Prussian government; and endeavored to improve on it by adding directions for the management of respiration, and for forming the initial letters of syllables.

Harnisch (1832) placed the location of the trouble in the larynx and back of the tongue. His system consisted of rules for the government of the tongue and lips.

Otto (1832) located the remote cause in the mental condition, or in such dynamic disturbances as arise from

debility of the nervous system, the proximate cause being the condition of the organs concerned in speech. He scouted the idea of laying down fixed rules to govern the treatment of all cases.

Sir Chas. Bell (1832) considered stuttering to be a partial chorea, the result of disorded respiration; and put great stress on the supposed action of the larynx in articulation.

Poett (1833) located the whole difficulty in spasmodic action of the muscles of speech, to the exclusion of those concerned in phonation. The proximate cause he believed to be deranged nerve-function.

Cull (1835) recommended systematic voice-training by rhythmic means, under competent instructors, repeated until a correct sequence of speech-action is established in place of the former faulty sequence.

Berthold the physiologist (1837), defined stuttering as impeded or unregulated motion of the organs of speech, caused by faulty condition of their muscular or nervous action. He pointed out the fact that the muscles of the lower jaw might be affected.

Warren (1837) considered stammering (by which he meant stuttering) as primarily caused by weakness, and consequently irregular action of the nervous system, proximately due to the depraved habit resulting from such irregularity of function. He divided the affection into two species;—one, in which the organs of articulation are at fault; the other, in which voice itself is wanting;—both being often united in the same case,

causing great nervous agitation, and contortion of the features.

Good (1840) adopted the classification of Sauvages (see *ante*); and for the cure of non-organic defects recommended exercise of the organs on the difficult sounds, as well as exercise of the will in controlling the muscles of articulation.

Hoffmann (1840) located the chief cause in spasm of the glottis, and his recommendations were directed to the prevention thereof.

Malebouche (1841), the purchaser of Mrs. Leigh's secret, naturally adopted a classification based on faulty tongue movements, denying the existence of any except lingual consonants. He considered the Leigh-Yates trick a good one, but of limited utility, and endeavored to improve on it by elevating the whole tongue to the palate, and also by directing treatment to the lips, inconsistently with his theory concerning the lingual formation of all letters.

Lee (1841) considered stuttering to be a neurosis, which, like all neuroses, is intermittent. He also believed in the existence of another form, to cure which he adopted surgical measures.

Dieffenbach (1841) commenced the surgical treatment of speech-defects, which raged for several years throughout Europe. His favorite operation was to make a horizontal section at the root of the tongue, excising a triangular wedge completely across and nearly through that organ, with the object of dividing the lingual muscles, and thereby interrupting their

innervation, in order to modify or cure the muscular spasm. His method was the result of a fancied connection between defective articulation and strabismus.

Velpeau (1841), starting from a theory that stuttering originated in an unusual depth of the palate, divided the hyo-glossi, stylo-glossi, and genio-hyo-glossi muscles, in different forms of the affection.

Amussat (1841), who with Velpeau, disputed Dieffenbach's claim of priority in these operations, divided the genio-hyo-glossi muscles.

Baudens (1841) operated similarly to Velpeau; *Froriep* (1841) divided the genio-hyo-glossus on one side only; and *Bonnet* divided the same muscles beneath the chin, in order to avoid hemorrhage.

About this time a mania took possession of the surgeons of Europe for the cure of defective speech, each one of note claiming to be the inventor of a new modification of some previous operation;—just as the gynecologists of the present day modify and remodify each others' specula, or pessaries. The methods were generally arranged by nationalities; the Germans following Dieffenbach; the French, Velpeau; the English as a rule confining themselves to the excision of the tonsils and uvula, as recommended about the same time by Yearsley and Braid. In the United States, Post, Mott, and Parker introduced the fashion of the day, and for a few years had many imitators. The blood of stutterers flowed like water. The resulting benefits were found to be of but temporary duration, the old defect returning usually as soon as the wound healed; while

the dangers to life from hemorrhage, gangrene, etc., several cases having died from the results of the operations, aided in making the surgical treatment unpopular after a time. During its hold on the profession, however, a great many operations were performed. We read of sixteen by Dieffenbach, forty by Blume, ten by Guersant, eighty-five by Amussat, twenty-one by Baudens, seventeen by Chassaigne, and seventy by Bonnet. A reaction set in after the results of the operations had time to show that not 5 per cent received the slightest benefit, and the most prominent surgeons hastened to disavow a treatment which has now passed into history.

Bonnet (1841) ascribed stuttering primarily to a nervous affection, secondarily to functional disorder of the organs of speech, the latter remaining as a local affection after the removal of the primary cause. He considered that all the phenomena are due to functional disorder of the tongue-muscles; and his remedy was division of the genio-hyo-glossi.

Marshall Hall (1841) believed the essential cause to be an imperfect act of volition, due to the involuntary action of a reflex spinal centre regulating articulation, which acted through irritation produced by excited incident nerves, the whole phenomena resembling a partial chorea. He denied the truth of Arnott's theory, which placed the seat of the affection in the larynx; and recommended the use of a continuous flowing manner of speech, avoiding as much as possible any interruption therein.

Wright (1841) located the cause of stuttering in faulty

action of the velum palati, and the organs forming the mute consonants.

Colombat de l'Isere (1843) fairly reveled in the nomenclature of defects of speech. Stuttering he divided into (1) *bégaiement labio-choréique*, consisting in spasmodic action of the lips, tongue, etc., and characterized by repetitions of the labial letters; (2) *bégaiement gutturo-tetanique*, consisting in rigidity of the muscles of the larynx, pharynx, as well as those of respiration, producing spasm of the glottis, and characterized by sudden stoppage of the breath-current, and difficult enunciation of the guttural sounds. He seems to have forgotten, or to have been ignorant of the fact, that there is a *bégaiement labio-tetanique*, in which spasm of the lips and tongue occurs, *without* repetition of the labial or lingual sounds. Colombat located the immediate cause in a want of harmony between the nervous excitation which follows on thought, and the muscular actions concerned in its expression. His treatment consisted in the use of rhythmic vocal gymnastics, to educate the muscles of respiration, phonation, and articulation to regularity of action; and by a system of opposing movements of the muscles of articulation he aimed at preventing the repetition of sounds. He also used many mechanical contrivances for the teeth and mouth, and obtained the Monthyon prize from the French Academy for his efforts to cure stuttering. Colombat assumed much credit to himself, which has not been granted him by succeeding writers. His theories and treatment were wholly borrowed from his prede-

cessors; but he certainly systematized their work, and rode no particular hobby of his own. He claimed to have permanently cured 354 out of 452 cases.

Beesel (1843) placed much stress on the position of the larynx in cases of stuttering; and recommended the exercising of the patient on the words which are found to be the most difficult for him.

Merkel (1844) considered that the primary cause of stuttering lies in an adynamic state of the organs, wholly due to a corresponding condition of the volition, resulting in a deeply-rooted habit of defective speech. In his treatment he placed great stress on the use of measures for raising the tone of the whole body, for lessening the force of the articulating organs, and for strengthening the energy of the respiratory function.

Bühring (1844) acknowledged that many and varied causes may produce stuttering by interrupting the normal isochronism which should exist between the actions of the various nerve-tracts which influence the muscular apparatus of speech.

Lichtinger (1844) attributed stuttering to predominance of the excito-motory (spinal) over the central (cerebral) nervous system, due either to the abnormal weakening of the latter, or increased energy of the former.

Blume (1844), a stutter-doctor, placed the proximate cause in a want of harmony between thought and speech; and believed that cases which exhibited the phenomena of the affection while singing or climbing a steep ascent, are incurable. In his treatment he used

mechanical contrivances, with exercise of the organs concerned.

Mrs. Hagemann (1845) blamed the tongue as the chief cause of stuttering; and used the Arnott *e*-sound with the Leigh-Yates trick, and the placing of an *n*-sound before each difficult syllable.

Becquerel (1847) located the proximate cause in faulty action of the respiratory muscles, permitting premature escape of the air; the retention and economic use of which, was the object of his treatment. A stutterer himself, he twice supposed that he was cured, once by Colombat, again by Jourdant; only to finally lose all hope of becoming permanently relieved by any treatment whatsoever.

Graves (1848) adopted the spasm-of-the-glottis theory of stuttering, and claimed to have discovered a method for its temporary relief; namely, to direct the attention away from the speech, by the patient's striking some object synchronously with the words spoken, keeping strict time.

Comstock (1830–1850), a Philadelphia physician, taught a system of elocution with special reference to the alleviation of defects of speech. With the modesty of the true teacher, characteristic of the institutions of that city, and in marked contrast with the blatant assertion of others, he did not claim to have *cured* even a majority of his cases. His method is described by one of his pupils as the exercising of the voice by reading aloud in unison with others, for several hours daily.

*An Anonymous M. B. of Oxford** (1850) attributed

* Probably Dr. Munro.

the defect (which he called "stammering") originally to an infirmity in the motor nerve-power, with a peculiar irritability of the nervous centre especially concerned in speech, which is driven into spasmodic action by the ordinary mental effort to speak. This motor weakness may have vanished, yet the defective articulation may persist from force of habit and mental anxiety on the subject. He advised the use of any of the suggested tricks as long as they proved useful, abstraction of the mind from the subject, remaining silent when the moral sense warns one of coming defective utterance, and attention to the general health.

Bishop (1851) considered stuttering to be most commonly induced by attempting to speak without producing vibrations of the vocal chords.

Angermann (1853) placed the primary cause in "defective volition of the mind upon the organs of speech;" the resulting perturbance proceeding "either from the mind, from the central organs, from the nerves, or finally, from the muscles."

Romberg (1853), in his treatise on nervous diseases, places stuttering among the neuroses of motility, and under the subtitle of vocal spasms.

Eich (1858) recognized numerous primary causes of the affection, which he considered are rather psychical than physical, denied that the stutterer ever tries to speak during inspiration, and considered abnormal respiration to be a result of stuttering, not its cause. He recommended the treatment of those afflicted in special institutions, where each case may be studied

separately, and treated according to its peculiar indications.

Hunt (1828–1851) treated stuttering successfully in England for many years, under the commendation of such observers as Canon Kingsley, and Mr. Liston, the eminent surgeon. His system of treatment is described by Kingsley as "naturally, and without dodge or trick, to teach the patient to speak consciously, as other men spoke unconsciously." By comparing the normal with the abnormal use of the organs of speech, he reduced the complicated phenomena to abuses of the action of the lip, the tongue, the jaw, and the breath, either singly or combined. Mr. Hunt's work was taken up successively by his son, Dr. James Hunt, of Hastings, and his son-in-law, Rev. H. F. Rivers, of Tunbridge, who conducted an institute for the cure of speech-defects, and published an elaborate treatise on the subject, in which stuttering is described as an intermittent mania of the organs of speech (lallomania), an affection of many causes, many degrees, and innumerable species, to some 22 of which names are given, sufficiently complex to cause themselves a mania of both the auditory and articulating apparatus, as for example "pneumo-laryngo-gnatho-cheilomania," "pneumo-laryngo-gnatho-glosso-cheilomania," etc. The treatment which alone can be successfully used is disciplinary exercise of the organs of voice and speech under the direction of an experienced instructor, who must be, *par excellence*, some member of the Hunt family.

Canon Kingsley (1860), a celebrated English orator

and writer, chaplain to the Queen, and Canon of Westminster, was himself a stutterer until he was nearly forty years of age, and has written at considerable length regarding the affection, making several egregious mistakes, and laying down some very foolish rules. The cause of stammering (stuttering), he says, may be traced in 3 cases out of 4, to conscious or unconscious imitation. In a letter to a young lady, he tells her that she stammers mainly because her upper teeth, like his, shut over the lower ones, and prescribes a set of rules for her guidance in reading and speaking, the chief of which relate to opening the mouth widely, (quoting Baalam's ass as authority),—reading and speaking slowly from a full lung,—keeping the tongue down (not up, as Mrs. Leigh taught),—and breathing inwards at every stop. He also advised the placing of "a bit of cork between the back teeth" when speaking, keeping the upper lip drawn tightly down; and condemned the practice of treating stammering children, holding that the age of childhood is an unsuitable time for the correction of the defect. He considered boxing as "over and above a healing art" for the stutterer. Had he been a Frenchman he would have said "fencing;" if an American, the "healing art" would have been base-ball, billiards, or bicycling.

Leubuscher (1860), professor of pathology at the University of Jena, locates the seat of spasmodic affections of the speech-organs in the tracts of the hypoglossal, facial, and spinal accessory nerves; and states that the etiology is frequently psychical. He recom-

mended methodical speech-gymnastics to regulate the innervation, applied by specialists.

Rosenthal (1861), professor of nervous diseases at Vienna, held a theory concerning the causation of stuttering, based on the feeble development of the respiratory muscles during childhood, producing habitual disharmony of respiration, and lessening the influence of the will thereon. Later he placed the real pathogenic cause in an hereditary morbid excitability, a congenital weakness of the apparatus of respiration and phonation situated in the medulla oblongata, which was affected in childhood by some psychical shock. He describes it as a disorder of the coördination concerned in the emission of sounds, increased by anxiety and embarrassment. As to treatment, he prefers the rhythmical method of Colombat and Klencke ; and says that it is best accomplished in special institutions.

Wolff (1861) places the cause of stuttering either in the nerves or in the organs themselves, each case requiring close examination in order to differentiate between the two causes. He denies that it is a disease, but calls it a morbid disposition of the organs of speech, and describes three species,—one, in which the respiratory organs are affected,—another affecting the vocal,—and a third, the articulating organs, to the latter ascribing as many as five subdivisions. His treatment consists in trying all methods and almost all drugs, and finally dividing the hypoglossal nerve.

Violette (1862) considers stuttering a complex affection, due to a single cause residing in the brain. His

method consists of vocal gymnastics, combined with gesticulation.

Béclard (1862), the physiologist, places the real seat of the affection in the nervous system, and especially condemns surgical treatment.

Klencke is a physician, and a conductor of an establishment for the treatment of stutterers in Hanover. In his publications (1844–1862) he has put forth several different theories concerning the nature of the affection, those referring to the moral nature of stutterers being vigorously disputed by writers in other countries. He apparently has had a very low order of patients under his care, but he has probably had the largest experience on the European continent in the treatment of speech-defects, and therefore his methods are entitled to careful consideration. In his latest work he shows an inclination to undervalue the importance of any special theory in regard to treatment, though placing great stress on the influence of scrofula as a causative factor, and apparently depends on empirical methods derived from observation, experiment, and comparison of results in many cases. Like the rest of the specialists he naturally doubts the ability of the ordinary physician to treat a case of stuttering, as a special didactic method is required. Averse to the use of drugs, he places great reliance upon regulation of diet and hygienic measures, for the improvement of the nervous and muscular tone. His treatment is commenced by endeavoring to arouse the will and keep it in constant action; then he drills the patient systematically in

the technics of speech. He defines his method as "a medico-pedalogical system of speech-gymnastic," and claims 148 cures between 1844 and 1862, the average time required for each being 20 to 25 weeks. Klencke distinguishes between stammering and stuttering, the former being manifested in singing and declaiming as well as in talking, having its causes in the articulating organs;—the latter being manifested only in talking, its causes lying in the organs of respiration and phonation. He insists on the necessity of correctly differentiating between these two speech-defects, giving their differential diagnosis elaborately and in tabular form.

Oré (1866) considered stuttering as always a local affection, though primarily proceeding from a nervous cause; and advised the use of surgical measures for its cure, his objective point being the genio-hyo-glossi muscles.

Schulz (1866) placed the seat of stuttering in an augmented excito-motory influence of the spinal cord upon the muscles of respiration and articulation; and directed that the treatment be commenced by measures calculated to diminish this influence, and to strengthen that of the will. Then he says, by persevering in the use of voice-gymnastics the habitual stuttering may be cured.

Chervin (1867), "parish instructor" at Lyons, or "professor of elocution" as we would say in America, is the present French authority on defects of speech. He writes very dogmatically and often confusedly about brain-irradiations, their comparative rapidity, continuity,

energy, and precision, in different subjects; and concludes that the higher brain, the intellectual seat, is chiefly at fault in stuttering. He says that he has tried all the systems of treatment with success, but relies mainly upon education of the will. He recognizes many causes for the affection, predisposing and exciting; and claims that the whole secret of treatment lies in the strengthening of the coördinate power of the divers actions of the vocal organs, by regular, progressive, persevering language-lessons, teaching the pupil to imitate the instructor's pronunciation; but above all, constant attention to the speech, and an energetic will, as necessary for overcoming the defect.

Marshall (1867), the physiologist, assigns the cause of stammering and stuttering to irregular action of the nervous centres.

Lehwess (1868) places the source of stuttering in either abnormal action of the respiratory organs, anomalies of individual muscles of speech, abnormal psychical conditions, or conflict between the will and the movements concerned in the production of speech. He believes rhythm to be a radical cure for the disorder.

Wyneken (1868) locates the chief seat of stuttering in the larynx, and defines it to be a functional vice, the greater and lesser manifestations of which depend on the psychical condition of the patient, and therefore a neurosis. Defective influence of the will, produced by doubt, he considers to be the proximate psychical cause. His treatment is largely based on imbuing the patient with faith in his preceptor and in himself; and

includes the exercise of the respiration, the voice, and the speech, with rhythmical beating of time. Wyneken learned his method in the establishment of Herr Katenkamp of Delmenhorst, where he himself was treated for the affection, but ineffectually.

Coote (1868) says that stuttering implies a want of power to coördinate action, and that its source must be sought for in the sensorium;—while stammering (paralalia) is due to timidity, or to some temporary defect of the tongue.

Guillaume (1868) defines stuttering as an affection of irregularly intermittent type, having two characteristic symptoms;—namely, the convulsive repetition of the same syllable, and a convulsive stoppage at a syllable. He considers that the affection is due to defective coordination of the necessary muscular action. Denying that speech and whispering are essentially different, except in the number and amplitude of the vibrations of the vocal chords in each, his treatment is based upon whispering exercises, with which he uses lip-gymnastic, and lays great stress on the necessity for keeping the tongue up to the palate, and for taking deep inspirations at every sentence.

Kreutzer (1870) conducts a school at Rostock, Germany, in which he teaches "religion, music, reading, "arithmetic, history, singing, deaf and dumb instruc- "tion, and also that for the cure of stuttering and "stammering." His system is one of very severe discipline, which, from the descriptions given of it, would seem to be such as would be tolerated only by idiots or

legal infants. He himself says that his method "includes not alone speech-exercises, not alone gymnastics "of the tongue, vocal organs, diaphragm and abdomen, " . . . . . rhythmical influence on the nervous system, "nor technical instruction as to how any single sound "must be spoken; it rather seeks to lay hold of the "entire man, since not only are all of the above-named "principles employed, but other means are also used, "according to the personality and character of the "stutterer."

Brown-Séquard is reported to have stated verbally that in his opinion stammering (stuttering) may be considered as identical in its nature with the trembling of the eyelid or the lip.

Bell (Alexander M.), founder of "a school of vocal physiology" in Boston, believed stuttering to be simply a habit, which can be uprooted at any stage, by intelligent and persevering effort.

Schrank (1875) defined stuttering to be a localized nervousness.

Coën, of Vienna (1875), called it the "result of a deficient atmospheric pressure" in the lungs, caused by disturbances of innervation. Later (in 1879) he is quoted as considering it to consist of a breath-spasm due to pathological changes in the respiratory apparatus. Of his first one hundred cases of speech-defects, he reports sixty-seven as stutterers, of which he cured forty, and improved the speech of twenty. His system is mainly an elocutionary one, with the Swedish movements and electricity as accessories.

Gunther (1879), principal of a German deaf-mute institute, is the author of a system of practical exercises for the cure of stuttering, by which the respiration is sought to be regulated, and brought under the control of the will; the voice is trained first on vowel-sounds alone, then on consonants, and finally on combined syllables, in a rhythmical manner, especial care being taken to avoid emphasizing the consonants.

Werner (1879), of Albany, N. Y., editor of "The Voice," considers stuttering to be an affection of the vocalizing organs; and stammering, one of the articulating organs. He recognizes a varied etiology, and treats these affections by elocutionary methods adapted to individual necessities. His charge is $200 for each case. By the promulgation in his journal of the views of the day regarding speech-defects, he is doing a real service to the legion of sufferers therefrom. He does not profess to have any special method peculiar to himself.

Howard (1879), of New York, is well-known as a specialist in the treatment of defective speech. His views concerning stuttering, as far as published, are difficult to understand, his forte seeming to lie rather in criticism of others, than in clear statement of his own opinions or methods. He appears, however, to attribute stammering and stuttering (dyslalia) to a throat-contracting habit, or contraction of the glottis on vowel-sounds, even when the stuttering appears to be on consonants, his theory being very slightly modified from that of Arnott. He claims to relax the constricted muscles of the chest and throat by what he terms "op-

posing movements," a method used years ago by Colombat. Mr. Howard advertises lessons by mail, for which he charges $40 per quarter of twenty lessons, payable in advance. For regular office lessons his fee is $60 per quarter.

Butterfield (1880), of Boston, professor of vocal physiology, etc., divides speech-impediments into (1) minor defects; (2) stuttering, in which a sound is repeated again and again; (3) spasmodic hesitation; (4) convulsive stammering, the organs of speech being closed and held with intense pressure. The main proximate cause he holds to be spasm of the diaphragm, becoming automatic by habit. His treatment is purely of the nature of speech and respiratory gymnastics.

Bristowe (1879), of St. Thomas' Hospital, London, defines stammering (stuttering) to be spasm of the vocal or articulating organs, which may occur at the lips, the point or root of the tongue, or at the glottis; but whatever the part affected, the disorder consists "either in a "sudden, simple, more or less prolonged spasm; or in "a series of such spasms in rapid sequence, during which "the implicated literal sound undergoes more or less "frequent repetition;" with generally, "a tendency, espe-"cially if the spasm be prolonged, for a greater or less "number of other groups of muscles to be involved." He believes that the resemblances of different cases to each other "are far more important than their differences, "and that the pathological explanation is the same in "all." I have quoted at the above length from Dr. Bristowe, for the reason that he is considered high authority

in Great Britain, on nervous disorders, and because I am in entire accord with his views concerning the pathology of this affection. As to the treatment he gives mere hints therefor, but these include possibly the continuous galvanic current, certainly attention to the breathing, deliberate and carefully balanced enunciation, with practice on the most difficult combinations of syllables.

Shuldam (1879), of London, in a short popular treatise, announces himself as a specialist in the treatment of speech-defects. He classes stuttering and stammering together, as essentially dependent on muscular spasm, finds fault with Canon Kingsley's rules, and in the matter of treatment seems to rely upon elocutionary drill of a rhythmical character, with regulation of the respiration.

Kussmaul (1879) defines stuttering to be a laloneurose, a dysarthria syllabaris, an intermittent spasmodic neurosis of coördination; in which there is a want of harmonious action between the muscles of respiration, vocalization, and articulation, manifested by spasmodic articulation of syllables, through spastic contractions of the articulating tube, at its stop-points for vowels and consonants;—most frequently depending on irritability of the coördinating centre which controls the formation of syllables, but may be induced by peripheral influences;—due simply and solely to a spasmodic inability to execute that vocalization of consonants which is requisite for the formation of syllables, the attempt producing spasm of the muscles of speech which spreads to the phonic and respiratory centres.

In respect to treatment he recommends careful education of the will-power; and exercise of the organs of speech and respiration, at first by vocal gymnastics directed to the pronunciation of separate and combined sounds, after some time by rhythmic speech;—being essentially the system taught by Klencke.

Hammond (1879), professor of nervous diseases at New York, ignores this affection in his text-book, but in a journalistic publication writes of stammering (stuttering) as a chorea of the muscles concerned in articulation, a defect of coördination, existing in two forms, (1) a difficulty of beginning the enunciation of sounds, especially those known as the explosives, which require the sudden opening of the lips; (2) that in which the sound is begun, but is spasmodically reiterated. The latter form he calls *stuttering*. He considers it to be the result of a functional disorder of that part of the brain which presides over the faculty of speech, resulting in a want of the power of coördinating the requisite muscular actions. Dr. Hammond states that he stuttered severely up to about the age of 19; and cured himself by the use of a consentaneous muscular act with each troublesome word, as tapping with the foot or the finger, for the purpose of attracting the attention from the effort to speak, thus rendering speech more automatic. Graves had announced this method of treatment many years before, (see *ante*, page 56); and it has been used for years by the traveling quacks, as well as by the people at large, as a remedy for this disorder.

SUMMARY.

If we analyze the foregoing view of the various theories and modes of treatment for stuttering, it will be seen that the authorities may be divided into three great classes, as follows,—

(1) Those who believed in the local causation of the malady, blaming the tongue, the hyoid bone, the tonsils, larynx, etc., and who will generally be found to have recommended mechanical contrivances, surgical methods, or the use of tricks, for the cure thereof.

(2) Those who held to the theory of the psychical causation, and who generally aimed at education of the will-power to remedy the difficulty.

(3) Those who considered the essential feature to be deranged nerve-function, or want of power in the co-ordinating centre or centres; and who relied mainly on elocutionary treatment, lessons of diction, with attention to the respiration, and to the general health.

A fourth, and smaller class may be formed of those who considered the affection one wholly of spasmodic nature, primarily due to imitation or shock, and continued by force of habit, fear, mental expectancy, etc., finally becoming all but automatic. With this class also, lessons of speech-gymnastic are almost entirely relied on for the cure of the affection.

Particularizing still more closely, the authorities may be tabulated thus,—

AS TO ETIOLOGY.

The brain and tongue blamed by—Galen, Mercurialis.

The tongue chiefly blamed by—Aristotle, Celsus, Ætius,

Ægineta, Avicenna, De Chauliac, Bacon, Menjot, Kustner, Savary, Itard, Wutzer, Deleau, Chégoin, Yates, Leigh, Malebouche, Dieffenbach, Amussat, Baudens, Froriep, Bonnet, Post, Mott, Parker, Hagemann, Oré.

The hyoid bone—Hann, Morgagni.

The tonsils and uvula—Yearsley, Braid.

Abnormal depth of the palate—Velpeau.

Velum palati—Wright.

Non-vibration of the vocal chords—Bishop.

Pulmonary vomicæ—Haen.

Scrofula—Klencke.

The palatine canals—Santorini.

Brain or nerve lesions—Avicenna, De Chauliac, Astrié, Hartley.

Irregular nervous action—Combe, Berthold, Warren, Blume, Leusbucher, Wolff, Béclard, Marshall, Coën.

Local nervousness—Schrank.

General nervous debility—Otto, Warren.

Muscular debility—Galen, Sauvages, Cullen, Itard, Good, Brown-Séquard.

Spasmodic neurosis—Bertrand, Poett, Lee, Kussmaul.

Spasm of the lips—Deleau.

Spasm of the epiglottis—Avicenna.

Spasm of the glottis—Yates, Arnott, Müller, Deleau, Schulthess, Hoffmann, Graves, [*and pharynx*] Howard, Harnisch, Beesel.

Spasm of the diaphragm—Butterfield.

Spasm of muscles of phonation and articulation—Thelwall, Serre d'Alais, Bonnet, Romberg, Wolff, Bristowe, Shuldam.

Spasm of muscles of articulation only—Poett.

Deranged coördination—Watson, Rullier, Voisin, Schulthess, Berthold, Colombat, Rosenthal, Hammond, Coote, Guillaume, Kussmaul.

Reflex spinal action—Marshall Hall, Lichtinger, Schulz.

Psychical causes—Mendelssohn, Darwin, Otto, Eich, Chervin.

Weakness of volition—Merkel, Marshall Hall, Angermann, Wyneken.

Disordered respiration—McCormac, Bell, Becquerel.

Imitation—Hartley, Kingsley.

Habit—Amman, Palmer, M. B. Oxon, Bell.

Want of the speech instinct—Magendie.

Varied etiology recognized by Frank, Hunt, Eich, Bühring, Chervin, Lehwees.

AS TO TREATMENT.

By mechanical contrivances applied to the tongue—Celsus, Itard, Astrié, Wutzer, Chégoin, Blume, Colombat, Klencke.

By cauterization of the tongue—Galen.

By division of the frenum of the tongue—Ætius, Ægineta, Hildanus, Kustner.

By passing needles through the tongue—Detmold.

By division of the lingual muscles—Dieffenbach, Lee.

By division of the extrinsic muscles of the tongue—Velpeau, Baudens;—*of the genio-hyo-glossi*—Amussat, Froriep, Bonnet, Post, Mott, Parker, Oré, etc.

By division of the hypoglossal nerve—Wolff.

By embrocations, cauteries, blisters, etc.—De Chauliac, Mercurialis, Kustner.

By excision of the tonsils and uvula—Yearsley, Braid.

By tricks—Demosthenes (*pebbles in the mouth*); Voisin (*pressing thumb on chin*); Broster, Leigh, Yates, Malebouche, Bausmann, Guillaume (*lifting tongue to palate*); Kingsley (*cork between the teeth*); Arnott, Müller (*an e-sound between each word*); Serres d'Alais (*syllabic pronunciation, with synchronous arm-movements*); Hagemann (*the Leigh method, and prefixing an n*); Graves, Hammond (*synchronous movements with each syllable*); M. B., Oxon (*any trick so long as useful*).

By the use of opposing movements—Colombat, Howard.

By regulation of the respiration chiefly—Avicenna, McCormac, Bausmann, Hoffmann, Merkel, Becquerel, Butterfield, Shuldam.

By attention to diet and hygiene with speech-exercises—Combe, Merkel, M. B., Oxon., Klencke, Shuldam.

By voice and speech gymnastics—Satyrus, Mercurialis, Mendelssohn, Darwin, Watson, Frank, Astrié, Combe, Deleau, Cull, Hunt, Merkel, Blume, Eich, Leubuscher, Schulz, Comstock, Chervin, Kreutzer, Gunther, Butterfield, Bell, Kingsley, Bristowe, Kussmaul, Shuldam, Howard, Werner.

Rhythmic exercises used by—Marshall Hall, Klencke, Colombat, Rosenthal, Lehwees, Shuldam, Kussmaul.

Faith and rhythm by—Wyneken.

Whispering exercises by—Guillaume.

Regulating the tongue and lip action—Harnisch, Malebouche, Bristowe.

Lessening force of the articulating organs—Merkel, Gunther.

Exercising patient on his difficult words—Darwin, Good, Beesel, Bristowe.

Removing the patient's attention from his speech—Bertrand, Graves, Hammond, M. B., Oxon.

By education of the will—Watson, Magendie, Good, Klencke, Schulz, Chervin, Bell, Kussmaul.

The foregoing arrangement is necessarily defective, several names being found under different headings, and many headings being similar or subordinate to others. But it is hoped that the list will serve a useful purpose in showing how much authority exists for any one theory, or method of treatment; and in helping to extricate from the confused mass of literature on the subject a few guide-posts by which to mark the way in any future examination of the question.

Synonyms of Dyslalia.—Mogilalia, Lallomania, Balbuties, Psellism, Bégaiement, Stammering, Stuttering, Impeded or Difficult speech.

Definition.—An intermittent functional disorder of speech, characterized by irregularly spasmodic action of the muscles concerned in articulation, more rarely of the muscles of phonation and respiration.

Varieties.—These are nearly as numerous as the cases, no two individuals stuttering alike, or on the same sounds. In ninety per cent. of the cases, however, the difficulty occurs at the consonants, especially those known

as "explosives," in which the succeeding vowel-sound is consonanted (if I may coin a term), by sudden movements of the lips or tongue. Nearly all writers on speech-defects state that the consonants are vocalized in speech. I believe that this statement is a reversal of the real process, and that it has given rise to much confusion. I therefore prefer to consider the vowel-sounds as continuous speech-elements; being modified in speech by the consonantal interruptions, or as I term it *consonanted.*

While no absolute line of demarkation is possible between the forms of Dyslalia, there are three great divisions of the affection, which are however often only degrees of the same disorder; and any two or all three may be combined in the same person. They are all susceptible of being cured, and by the same method of treatment. These forms are as follows:—

(1) *Spasmodic Hesitation,* characterized by a slight choking sensation, and impeded action of the respiratory apparatus. This is generally the earliest form in which the affection appears; and also that in which it often persists in cases of severe dyslalia which have been partially cured.

(2) *Stuttering,* a clonic spasm of the articulating organs, characterized by the repeated utterance of one sound, before the organs can pass to the combination of movements necessary for the production of the next. This is the "bégaiement labio-choréique" of Colombat, the "bégaiement fermé" of Becquerel. In it the mute consonants *b, p, t, d, g, k,* the resonants *m, n,* and the

vibrative *r*, also the initial *wh*, are those presenting the greatest difficulty.

(3) *Stammering*, a more tonic (tonoid) spasm of the same organs, lasting for some seconds; the organs being, as it were, temporarily sealed together, and requiring a great effort to separate them in order to proceed to the utterance of the vowel part of the sound. If prolonged, the spasm may extend to the muscles of phonation and respiration, producing in severe cases almost tetanic rigidity thereof, requiring violent convulsive efforts to enunciate a single sound. This is the "bégaiement gutturo-tetanique" of Colombat; the bégaiement ouvert" of Becquerel, and affects the same sounds as the second form, and in rare cases even the vowel-sounds themselves.

Very few cases present any difficulty in singing or in whispered speech; and in most cases the affection is very much alleviated by the use of a declamatory style, or by a rhythmic manner of speaking. Some stutter and stammer most in the presence of strangers, others in that of their friends. Some are relieved by excitement, which makes others stutter more violently. The disorder is greatly aggravated by fear of mockery or punishment, by embarrassment from any cause, and by the conviction that certain sounds are insurmountable.

Pathology.—In all forms and varieties of the disorder the essential condition present is *spasm* of a greater or lesser degree; which necessarily implies deranged nerve-function. The organs themselves are rarely, if ever, abnormal as to size, position or condi-

tion. The almost universally intermittent character of the affection points unmistakably to derangement of nerve-function, without the existence of muscular or even nerve lesions.

The spasm may occur at the various stop-points of the vocal tube;—if at the lips, labial dyslalia is produced;—when at the point of the tongue, the dental sounds are affected;—if at the back of the tongue, guttural dyslalia results;—and (rarely) at the larynx, when the glottis being affected, phonation itself becomes impeded.

By the continuance of any of these forms of spasm, a spasmodic habit is acquired, which becoming more or less automatic in course of time, passes more and more from under the control of the will, and eventually produces confirmed dyslalia; perhaps by the resulting vicious automatism of some nerve-centre not yet located, which may preside over the coördination of the movements of speech alone.

That the ordinary centre for the coördination of muscular action is affected I do not believe; for such a theory demands the existence of similar defective action of the other voluntary movements, which is contrary to the facts observed.

Etiology.—Among the predisposing causes may be mentioned hysteria, chorea, epilepsy, gout, hemorrhoidal diathesis, scrofula, cretinism, onanism, spinal irritation, and such mental conditions as weaken the power of the will.

The primary causes usually operate in childhood, and

are manifold, being found in any influences which produce shock to the nervous system. Thus, fear, timidity, a fall, fright, or ill-treatment, may produce the affection.

*The proximate causes** are also many, the chief ones being,—(1) Nervous excitability, during which the voluntary coördination power is defective. (2) Debility after disease. (3) Peripheral irritation (as from worms), the cause of so many other forms of local spasm.

But the principal proximate causes are two, imitation, and mental expectancy; the latter succeeding the former, and more properly a cause of the affection becoming confirmed.

Imitation is at the bottom of a majority of the instances met with. In childhood this faculty is more highly developed than at any other age. By it the infant learns all the arts of its life; even speech itself is only acquired by means of imitation. Naturally then a child, thrown into the companionship of a stutterer, learns to imitate his speech, just as he learns to imitate normal speech from those who speak normally. Is the child to be punished or even blamed for this exercise of so predominating a faculty? No! but the parent deserves the blame who permits his child to remain, even for a day, in the society of a stutterer. It is *he*, and not his stuttering boy, who should get the blows, the mockery, the sneers, which *he* often levels at the innocent victim of his criminal neglect, and worse than criminal ignorance.

* In 200 cases Hunt found the causes as follows. Inherited 15 per cent.; Involuntary imitation 9 per cent.; Voluntary imitation 4 per cent.; Convalescence after illness 7½ per cent.; Fright or ill-usage 5 per cent.; Unaccounted for 49½ per cent.

Mental expectancy is a powerful factor of this affection. When the attention is directed to the action of muscular movements which have become more or less automatic, there results almost invariably a degree of inaccuracy in such movements. If the influence of fear be added, the irregularity becomes more marked. The mechanical processes of speech constitute a very complicated art, requiring that the movements of several groups of muscles be coördinated with the utmost nicety; and especially that these movements may pass from one combination to another, with the greatest possible accuracy and ease. The very anticipation by a sensitive mind of a difficulty in executing a certain combination will almost invariably induce a spasm thereat; and when such an influence exists in addition, as the expectation of a blow, or the more hurting sneer, the spasm is as certain to be produced as the attempt is made to emit the difficult sound.

In thus practically stating that Dyslalia is a vicious habit of speech, I should not be construed as making light of the affection in the slightest degree. Our ordinary habits, once formed, are truly parts of ourselves, and most difficult of eradication. How much more so must be an habitual spasm of certain muscles, which has become to a certain extent automatic; and thereby passed more or less beyond the influence of the will!

Cause and effect are constantly found changing places, or passing, the one into the other, in this disorder. The state known as *nervousness* is often a cause, but more frequently an effect, the consequence of the affection;

many, if not most of the cases of stuttering showing nervousness only connected with their speech, and not as a general habit of body. Nervous people are not usually stutterers; and women, who are more nervous than men, are affected in a much less degree by speech-defects.

Again, moral causes succeed to physical causes, and confirm the disorder, as so frequently pointed out in this essay.

So, also, confusion of thought may be a cause. Speech is the result of thought, acting by nervous and muscular processes, and must be defective if either thought, nerve, or muscle fails to perform the function belonging to it. Confused thought is most generally the result of the affection, a stammering tongue producing a stammering brain. But on the other hand, stutterers often display an astonishing fertility in synonyms for words which they wish to avoid, and in other ways present every indication of clear intellect and concentrated thought-power, enabling them to achieve distinction in spite of their defective utterance.

Symptoms.—The phenomena observed in this affection are sufficiently common to require but cursory description here; almost every person being familiar with its symptomatology, the essential feature of which, in ninety per cent. of the cases, is difficult articulation. Occasionally an instance is met with presenting impeded phonation, but in such, it will be found that the stoppage of voice is a secondary symptom, resulting from the general spasmodic condition induced by the convul-

sive efforts at enunciation. At first there is noticed a halt on some syllable beginning with an explosive consonant, followed by anxiety and a condition of expectancy on the part of the person affected for the next difficult syllable, producing a mental search for a synonym of easier pronunciation, resulting in a halting, irregular hesitation in speech, an outré manner of expressing the ideas. Soon another difficult syllable is encountered, for which a synonym cannot be found, the embarrassment of the sufferer is increased, spasms of the various organs of articulation occur more frequently; —now of the lips, affecting the labial sounds; then of the tongue, affecting the dental consonants; the articulating organs seeming as if temporarily glued together in some cases, in others as though alternately attracted to and repelled from each other. As embarrassment increases, the spasms become more violent, until in severe cases a general spasmodic condition of the muscles of articulation, phonation, and respiration ensues, with even tetanic rigidity of some groups; the patient's voice becomes lost, he gasps for breath with a nearly empty lung, and silence alone brings temporary relief to the general distress of body and mind. In confirmed cases the respiratory muscles stutter in consonance with those of speech; in many the mental action becomes halting and doubtful, and the man stutters mentally as well as physically.

The Moral Nature of stutterers has been much discussed, some writers finding it utterly perverted, their cases being naturally secretive, vacillating, unreliable,

fanciful, without principle, etc.,—others lauding the whole class of stutterers as more upright, honest, and intelligent than the ordinary run of mankind, and as capable of as much usefulness to the community. Much of the difference observed is doubtless due to the different classes of society from which the patients have come; but other things being equal, the characteristics of a stutterer's nature will in great measure depend on his surroundings during his youth. Wanton mockery of his infirmity, blows, ridicule, and similar treatment, must necessarily produce secretiveness, deception, selfishness, dislike for the society of others, and many other such traits of character, which are often markedly exhibited by stutterers. Doubtless there are many cases in which sluggish intellect makes successful treatment more than usually difficult; but comparatively considered, they are few in number. From personal acquaintance with a large number of stutterers I am convinced that they differ in no wise from other average men intellectually or morally; though I have known some who showed all the characteristics of an abused dog, and seemed to be possessed of every unamiable feature which a man's character could acquire. In every such case which has come under my observation, the history has been one of ill-treatment in youth.

Statistics. Colombat calculated that France contained one male stutterer to every 2500 persons, and one female so afflicted in every 20,000. Later estimates, based on the number exempted from the military service for severe stuttering, gave 3 in every 1000. M.

Chervin, counting light and severe cases increases the number to 5 in 1000. Otto estimated for Prussia a rate of 2 in 1000. Hunt considered that at least 3 in 1000 was a fair average for England, excluding cases of paralalia, and other forms of defective speech. These rates applied to the present population of the United States would give from 150,000 to 250,000 stutterers in this country.

The proportion of female to male stutterers is variously stated by different observers. Itard, Astrié, and Rullier doubted that any females stuttered. Colombat observed $4\frac{2}{3}$ per cent. of the whole number, Klencke $34\frac{4}{10}$, Wyneken $12\frac{1}{4}$, Hunt $12\frac{1}{2}$ per cent. Coën's experience shows only $1\frac{1}{2}$ per cent. Various complimentary reasons have been assigned for this difference between the sexes, but none are satisfactory. Every theory regarding the etiology of the disorder, especially those which ascribe it to nervous derangement or susceptibility, bashfulness, or imitation, should make the female the sex most liable to be affected. But the facts are in direct opposition to such a conclusion, showing that the reverse is the case. No one has yet offered a valid reason for such an apparent contradiction. I believe, as heretofore pointed out, that it is due to the maternal influence surrounding the girl in her youth, instead of the paternal, which is exercised on the boy.

The influence of age is shown by Hunt and Klencke, as follows,—the figures representing percentages of the whole number of cases observed.

Sex.	Under 10 years.	Under 14 years.	Under 15 years.	10 to 15 years	14 to 20 years.	15 to 20 years.	15 to 22 years.	20 to 30 years.	Over 20 years.	Over 30 years.	Observer.
Males.	9	....	....	19	....	38	....	29	....	5	Hunt.
Females.	$5\frac{1}{3}$	....	....	13	....	37	....	$39\frac{2}{3}$	....	6	Hunt.
Males.	....	....	37	....	....	....	19	$5\frac{4}{16}$	....	$3\frac{1}{3}$	Klencke.
Females.	....	19	....	....	13	....	....	....	$2\frac{7}{16}$	$0\frac{7}{16}$	Klencke.

Civilized nations are not in possession of a monopoly in respect to stuttering. The Hottentots were so called by the Dutch in derision of their stuttering speech. The negro tribes on the west coast of Africa contain, according to Dr. Clarke, of Sierra Leone, as many stutterers and stammerers proportionally, as are found in Europe. Nations whose language is mono-syllabic and rhythmical, as the Chinese, suffer very slightly from defects of speech. During several years spent among the Indian tribes of Arizona, I observed many cases of stuttering among the Apaches and the Maricopas, whose language is harsh and consonantal; but never one among the Pimos, whose speech consists of vowel-sounds almost entirely. Colombat mentions the case of the son of a French father and a Chinese mother, who stuttered violently in French, but spoke his mother's language with the greatest facility, corroborating my theory of the beneficial influence exercised by the mother over the speech of the child.

Diagnosis. For the sake of perspicuity, the chief points of difference between difficult speech, stuttering or stammering (dyslalia); and vicious speech (paralalia), may be recapitulated in tabular form, as follows:—

In Dyslalia.	*In Paralalia.*
The patient has no difficulty in enunciating the separate consonants.	He has.
The peculiar stutter-spasm is present at each difficulty of speech.	Spasm is not present.
The patient exhibits much nervous embarrassment.	He does not.
Benefit is afforded by the use of rhythm, melody, a declamatory style, or syllabic speech.	Not so.
The articulation is unduly prominent.	It is not.
The respiration is irregular.	Is not.
R, L, S, and other continuous letters present little difficulty when joined with long vowels.	R, L, S, etc., are usually the most difficult letters.
The patient generally speaks with more difficulty when under observation, or when questioned about his defect.	Under such circumstances the speech is improved.
The patient presents no anomalies of the organs of speech.	Anomalies of the lips, tongue, etc., are often found.
Whispering speech is seldom impeded.	The defect is as marked in whispering as in loud talking.

Prognosis. Very few cases are incurable, if the proper treatment be commenced in early or middle life, and steadily persevered in for a sufficient length of time. The prognosis is unfavorable as to cure in patients of advanced life, or in those presenting spasms of great severity, or where there is marked weakness of the volition. Hereditary disposition to defective speech, and congenital weakness of the coördinating power, are also considered unfavorable to a cure. Probably weakness of the will-power is the most unfavorable symptom, such a condition necessarily preventing that arduous application which is absolutely necessary to a successful issue.

Kingsley lays down the axiom that a stutterer's life is one full of misery, and always a short one, by reason of the mental depression, and misdirection of vital energy which is induced thereby. In the older countries, and especially under the depressing influences of competitive examinations and a humid climate, such a statement as the above may be substantiated by the facts; but it is not applicable to the United States, where hope reigns supreme in every walk of life; and where even the confirmed stutterer need not despair of finding a place in which he may become a useful member of society.

The records of cases treated show much encouragement for the accomplishment of radical cures in even the most severe cases.

Klencke, in 15 years, treated 148 cases, and claims to have had but one failure.

Coën's first 67 cases resulted in 40 cures, 20 improved greatly and 7 failures.

Chervin, in 6 months treated 52 cases, of which 46 were cured; four, failing to apply themselves to the exercises were only partially benefited, leaving 8 failures.

On the other hand, an American teacher, Howard, of New York, states that "relapses from partial relief are the rule, permanent cures the distinguished exceptions;" and Robert M. Zug, who has a local reputation in Michigan in the treatment of stuttering, reports the result of his own experience of 150 cases, as giving but 15 radical cures.

Individual instances of complete relief being obtained from self-treatment in adult life, are by no means rare, Demosthenes, Canon Kingsley and Dr. Hammond being prominent examples. The first two had the correct method pointed out to them, and received more or less instruction from teachers; the latter seems to have followed the advice of the doctor to Macbeth, and therein ministered to himself.

Treatment of Dyslalia. The present aspect of authoritative opinion respecting the treatment of this affection may be reduced to four axioms, namely—

(1.)—That surgery has confessed its incompetency to deal with the disorder; and that its methods may be dismissed from consideration, as inapplicable thereto.

(2)—That no direct benefit can be expected from either electricity or medicine, alone or together; but that much indirect good may result from the use of medicinal, electrical, and hygienic measures, for the correction of special symptoms and the general health, while the appropriate treatment is in progress.

(3.)—That the tricks resorted to by charlatans may often be of temporary benefit; but as soon as the organs become accustomed to them their efficacy becomes entirely lost.

(4.)—That the only rational and efficacious method of treatment is disciplinary exercise of the respiratory, vocal, and articulating organs; conducted unremittingly and patiently, until a correct habit of speech is established, and aided by the use of the utmost degree of will-power of which the patient is capable.

The treatment of stuttering may then be arranged under the following subdivisions.

Prophylactic.
Hygienic.
Medicinal.
Electrical.
Use of tricks.
Disciplinary exercise of (*a*) the respiration.
(*b*) the voice.
(*c*) the articulation.
(*d*) the volition.

Prophylaxis is of great importance, inasmuch as by the timely use of such treatment, the affection may almost certainly be arrested in its incipiency, and the patient spared much subsequent suffering. It requires especially the use of imitative methods for the correction of the defect; imitation, the predominating faculty of childhood, being thus utilized. The commencing stutterer should be immediately removed from association with any person similarly affected; and great care should be exercised by those around him to pronounce their words deliberately and clearly. Every influence which tends to excite the nervous system should be carefully avoided. His parents should treat him with especial kindness, taking him into their confidence, and striving to gain his fullest confidence in return. No mockery of his defect should be permitted in his presence; all harsh measures should be avoided with him; and the irritability of his parents should be vented, if it must be, on their other children. No particular atten-

tion should be directed to his disorder at ordinary times, especially should the parents avoid that continual nagging to which many of them are given. The child should, however, be required to read or repeat, daily, for as long a time as may be deemed proper to his age, exercises for the vocal and articulating organs, of the character hereinafter described. With such methods, attention to the invigoration of the body by exercise and proper nourishment, and careful examination and treatment by the medical attendant for local irritations which may act as exciting causes, no early case of functional stuttering will ever become confirmed.

Hygienic Measures must be considered in all cases; and may be reduced to a few simple rules. The patient should avoid using tobacco and alcohol, or any other agent which unduly excites or depresses the nervous system. If the patient has been habituated to the use of stimulants or tobacco, he should not be suddenly deprived of either; but attention should be paid to their result upon the speech in each case, and the patient guided accordingly. A stutterer should live well, but moderately; and endeavor to acquire deliberation in thought, action, and speech; not avoiding society, but abstaining from dissipation of every kind, and always controlling his emotions. Plenty of exercise in the open air will be found of inestimable benefit. The mind should be fully occupied by some pursuit; and if secret sexual sin be indulged in, it should be entirely stopped. The latter is frequently associated with severe speech-defects, in all probability from the misanthropic habit of mind so likely

to result from the isolation which the stutterer feels himself condemned to. No compromise measures are possible here, for the habit is one which grows by indulgence, and when indulged in to any extent its influence on the will-power is most injurious, seriously complicating the speech-defect, and rendering the cure more than usually difficult.

The Medicinal Treatment must necessarily be of an auxiliary nature. Drugs will never cure a habit, though indirectly they may assist the will to throw it off, by giving tone to the nervous system, correcting such dyscrasiæ as may exist, benefiting the general health by stimulating assimilation, and by mitigating severe spasms of the speech-organs. The use of the group of *cerebral sedatives* (bromides, chloral, opium, etc.), though often of temporary benefit, cannot be continued without most injurious results, through their depressing influence on the nervous system, and the derangement of the digestive organs which they produce. Even the temporary calm induced by their occasional administration is certain to be followed by a reactionary excitement, which is succeeded by severe depression of body and mind. The *motor depressants* (gelsemium, conium, physostigma, lobelia, aconite, etc.), will be found the most suitable class which can be usually employed in the absence of special indications.

Among the *excito-motors* also, are many agents which may be of benefit in certain cases. *Belladonna* is stated by Professor Bartholow to have the power of allaying irregular or spasmodic movements; and where the

general condition is one of plethora, the face flushed, and congestive headaches frequent, this remedy in small doses will be found useful. *Hyoscyamus* and *stramonium* will also find their places; the former when there is wakefulness at night, and nervous excitement, without a plethoric condition; the latter in violent temperaments, cases presenting severe spasms, and those in which belladonna is found not to agree. *Nux vomica* is an excellent tonic when the digestion is deranged; and also acts well as an antispasmodic. *Ignatia* in small doses is strongly recommended by Dr. Piffard for nervous erethism, and to control functional phenomena of the cerebro-spinal axis. In cases exhibiting tendency to neuralgia, with hypochrondriasis, trembling agitation, and paleness of the face, this remedy will be found exceedingly useful. *Arsenic*, *quinia*, and *iron* may be given as tonics in cases in which they are indicated; the first-named lessening the mobility of the nervous system, at the same time that it promotes constructive metamorphosis (Bartholow).

Electricity has been used by some of the specialists in this affection, without success; except that while the current was passing through the nerve-tracts the patient could speak with greater ease (Hunt). From the results which have been obtained from its use in chorea and various forms of local spasm, it would seem that the unfavorable reports concerning its use in stuttering have been made upon insufficient trial. Professor Bartholow (Medical Electricity, page 135, *et seq.*) gives numerous authoritative recommendations of the gal-

vanic and faradic currents for the cure of spasms. In the absence of reliable experience in the use of electricity for stuttering, it is difficult to point out any positive indications for its employment therein. The static form should be tried, the patient being placed on the insulated stool daily for 15 to 20 minutes, and charged with franklinic electricity. Care should be exercised in the use of this agent on susceptible subjects, and the results watched closely before renewing the application.

Tricks and Mechanical Contrivances have been much used in the past in the treatment of this affection, by many prominent physicians and teachers. (See *ante*, page 73.) To-day they form the sole stock in trade of the ignorant charlatans who travel around the cities, advertising sure cures for fifty or one hundred dollars in advance. Founded on the empirical method, which applied to nervous affections must always be unscientific, their use appeals most naturally to the approbation of the *οἱ πόλλοι*, who always reason empirically. Let a quack stutter-doctor assert that certain definite persons were stutterers, used a certain trick, and were cured; nine persons out of every ten will conclude that all cases of stuttering must be cured by the same means; and if the trick be kept a secret, the tenth person will most likely believe in it also. Blind empiricism is the curse of the treatment of speech defects, as it is also of general therapeutics.

The prevailing tricks of the day are as follows,—

"*Drs.*" *Moses and Rivenburg* take the victim's fifty or one hundred dollars, and in return tell him to think

of opening his glottis at every word; and while speaking, to hold his chin near his neck with the same object.

"*Dr.*" *White* takes all he can get, binds the patient to secrecy, and imparts to him the old muscular movement of Graves and Hammond, striking with the finger or the foot at every syllable spoken.

"*Prof.*" *Mann* teaches his victims to breathe hard and nod the head while speaking; and gives a few exercises in respiratory method.

"*Prof.*" *Grady's secret* is that the human mind contains at the same time *one thought and a half*, and in the short space of two hours he teaches the stutterer to banish this half thought, which according to St. Grady, is the sole cause of the defect. The means used to accomplish this end are jingling the watch-chain, striking the hips, and other similar "natural and graceful movements." This fraud upon suffering humanity operates chiefly in Canada, notwithstanding the stringent medical legislation of that country, and is introduced to his victims by the recommendations of some fifty ministers of the English state church, and many other prominent citizens of Toronto, Ottawa, Montreal, etc.

Another stutter-doctor directs the patient to wear a leaden ball suspended from his neck by a string, so that it will lie in the supra-sternal depression.

The Bates appliances were extensively advertised for the cure of stuttering a few years ago, and have made many victims. They cost $35, are patented, and consist of three articles, (1) a coin-silver instrument in the form of a small flattened bed-pan, worn in the mouth with

the handle projecting between the lips, for the purpose of giving access to the air and egress to the breath in labial stuttering:—(2) a small gold tube to be attached by a rubber band to one of the teeth for the relief of the dental form:—(3) a larynx-compressor, capable of increased pressure by tightening up a screw and a buckle, attached to a band for the neck, to be worn by those who have difficulty in enunciating the gutturals. As nearly every serious case of stuttering presents all the forms mentioned, the simultaneous use of the three appliances would be necessary in order to be prepared for any emergency. The folly of expecting benefit from such contrivances for any length of time is known by experience to the writer, who gave the above mentioned sum for a set of these toys at a time when he had to deny himself the necessaries of life in order to pay for them. But "*experientia stultorum magistra.*"

Other tricks, some of which have been already mentioned in these pages, are,—pressing the thumb on the chin,—speaking with bullets or buttons in the mouth, or a cork between the teeth,—syllabic pronunciation with consentaneous muscular movements,—using an extraneous sound before each difficult word,—tongue-plates, tongue-forks, tongue-bridles, tooth-clasps;—drawling, singing, whistling, sniffling, stamping, or beating time,—and forcing the tongue into unnatural positions, while speaking.

A method of speaking, which is nothing more than a combination of tricks, has been lately published in a popular magazine (*Chambers' Journal*, 1880, page 635).

The writer avers that "results perfectly astounding" were produced in his own case by a rigid observance of Dr. Arnott's old trick, using as a prefix to all consonant initials the short *ĕ*-sound, as in the French words *de, le, me, se,* etc., and by making an artificial division of the words in a sentence so as to bring the consonants at the ends of the divisions. For the initials *w, y, u,* should be substituted respectively the sounds *oo, ee,* and *eeoo.* For example, the sentence—

"Would you willingly aid in securing unanimous consent to the robbing of medical practitioners by taxation?" should be pronounced thus:—

"Ooould eeoo ooillingly aid ins-ec-uring eeoonanimous ĕc-ons-ent ĕto ther-obbing ofm-edical ĕpract-itioners ĕbyt-axation?"

The writer of the article referred to insists that with practice, and avoidance of dwelling on the substituted ĕ-sound, such a manner of speech will not seem markedly peculiar to others. In this connection it may be stated that Dr. Arnott's suggestion, as well as his theory of the cause of stuttering, has been omitted from the revised edition of the book in which he announced them, namely his "Elements of Physics." [See the 7th edition, edited by Drs. Bain and Taylor, N. Y., 1877.]

The whole subject of tricks and mechanical contrivances may be dismissed in a very few words. Any one of them may be found useful while a novelty to the patient, serving to concentrate his attention and to exercise his will, by constituting an additional obstacle to his speech which rouses the whole latent will-power

to overcome it. Thus, in conquering the new and greater obstacle, the older and for the time being lesser one is surmounted at the same time. But when by usage the organs become habituated to the trick, the will is freed from the necessity of exertion, the stammer returns with as much severity as before, the patient curses the quack who victimized him, and relapses into despair.

I would use some of these tricks in the treatment of dyslalia,—first one, then another, just so long as the efficacy of each seemed to last. I would only depend on them as auxiliaries, tending to relieve the monotony of the treatment proper, as well as to give the patient confidence in the ability of his physician to eventually accomplish the cure of his case. By themselves, and for any other purpose than this, they are not to be depended on.

Disciplinary exercise of the organs of respiration, phonation, and articulation, and the will, is the true treatment for this disorder; and may be undertaken by any intelligent physician, who understands the nature of the affection, and possesses the patience and self-control requisite for the proper performance of his duties in the case, as well as the necessary degree of perfection in his own speech to enable him to inspire respect on the part of his patient.

The treatment should be pursued on two essentially different lines, according as the subject is of adult or tender age. In the former case his attention may be concentrated on his difficult words, and his will power

brought to bear upon them particularly. With children, however, the sounds which are most troublesome should be avoided, lest the fear be excited; and the exercises used should be directed with the object of training the organs to correctness of function, by means of the faculty which has probably caused their defective action,—imitation. In adults the will is usually strong, in children it is weak; but in the latter the imitative faculty is astonishingly active. Both of these facts should be utilized.

A careful examination of the patient is necessary, in order to ascertain the general state of his health, the nature of his habits, the probable proximate cause of his defects, and the existence of any special influences which may retard or prevent a cure. The vocal and articulating organs should be examined for evidences of congestion, hypertrophy, etc., though malformation of the organs will rarely be found; Colombat did not find one in a series of over 600 cases. The specially difficult sounds should also be noted. If possible, he should be removed from association with others in school or business, as the case may be, for a time; lest the influence of eight or ten hours of daily stuttering should counteract the benefit derived from his two or three hours of daily treatment. Hygienic and medicinal measures should be inaugurated, according to the indications presented by each case.

Deliberation should mark every step of the treatment, every minute of the instructor's intercourse with the patient. Nothing must be done or said hurriedly. Neither

party should permit any excitement of body or of mind to arise during the lessons; and as a necessary consequence the director must keep himself in perfect equipoise in order to guide the patient, and exercise the necessary control over him.

Regulation of the respiration is the first step. Stutterers almost invariably present abnormalities of breathing, and may have narrow, sunken chests, with but partial use of their respiratory apparatus. The question of abdominal (diaphragmatic) *versus* costal respiration has been much discussed; most of the authorities insisting that the latter form is injurious. The importance of abdominal respiration is however much overrated, for it is well known that women, who are so rarely affected by stuttering, use this form of breathing much less than the other. Be this as it may, the stutterer should be exercised upon respiratory methods, until he gains full control over his breath; taught to emit it in regular cadence, and by degrees; inspiring with equal regularity, and never speaking with an empty or nearly empty lung.

The following examples are given as mere suggestions for the exercises to be used:—

* * * * * * ! ! ! ! ! ! .....
* * * ! ! ! .....
* * * ! ! .....
* * ! ! .....
* * ! !.....* * ! !.....* * ! !.....
* * * * ! ! !.....* * * ! !.....

The instructor should work out a series for himself on the lines herein pointed out. [The asterisk denotes inspiration; the exclamation point, holding the breath; the dots, expiration; the dash, sustainment of the preceding vowel during expiration.]

Next the patient may pronounce the vowel sounds, noticing carefully the relative positions of his larynx, mouth and lips, for each.

* * * * ! ! ! ee ——————————

* * * * ! ! ! ay ——————————

* * * * ! ! ! ah ——————————

* * * * ! ! ! aw ——————————

* * * * ! ! ! oh ——————————

* * * * ! ! ! oo ——————————

The vowel sounds should be well sustained during expiration, and the passage from the one to the other effected gradually and smoothly. The instructor will find a baton useful to mark the inspiration and expiration, and the cadence of the exercises. In this way the phonation exercises may be combined with those for the respiration, in innumerable variety, by the exercise of a little ingenuity on the part of the teacher.

A word of caution is necessary here. Such exercises as the foregoing, kept up twice a day for an hour each time, will soon become monotonous, and are apt to be resisted by adult patients who cannot appreciate the necessity for systematically doing, over and over again, actions which they can perform with perfect ease. But the teacher

should insist on their use for two weeks at least, and for a longer time, if possible. The object is to secure correct automatism of respiration during speech, and flexibility of the muscles concerned in phonation; and can only be accomplished by habitual exercise. The monotony of the lessons may be relieved by simple explanations of the functions of respiration and phonation. Even to comparatively well educated persons such teaching will be useful, and the most ordinary intellect will be interested and benefited thereby. Perseverance in the preliminary part of the treatment is necessary, as much for its physical influence on the patient as for the reasons above stated.

The next step is to exercise the articulating organs in combining consonants with vowels. This can best be commenced by the use of short words beginning with vowels; requiring the patient to sustain the vowel sound, and to place greater stress on it than on the consonant. Each word should be sustained, and no stoppage permitted between words enunciated in one expiration.

Thus,—

* * * ! ! aw——ll, [*not* all———].
* * * ! ! ah———s, * * ! ! ee———t.
* * ! ! oh——m, * * ! ! oh———lder.
* * ! ! aw——rder, * * ! ! ah——fter.
* * ! ! ee——n——ee——ch——hou——r.

After some time on such exercises as the above, say two hours a day for a week, the patient may use words

beginning with consonants. In these exercises he should be taught to diminish the exaggerated importance which most stutterers give to consonant-initials; keeping in mind constantly the necessity for regular inspirations, and uninterrupted expirations.

* * ! *ah—bah—ah—pah.* (pure labial movements.)
* * ! *ah—vah—ah—fah.* (labio-dental movements.)
* * ! *ah—jah—ah—chah.* (labio-lingual movements.)
* * ! *ah—mah—ah—nah.* (nasals.)
* * ! *ah—sah—ah—thah—ah—zah.* (dento-linguals.)
* * ! *ah—rah—ah—lah—ah.* (palato-linguals.)
* * ! *ah—dah—ah—tah—ah—dah.* (palato-linguals.)
* * ! *ah—gah—ah—kah.* (gutturo-linguals.)
* ! *ah—brah—ah—bree—ah—bray—ah—broh—ah—bru.*
* ! *ah—prah—ah—pree—ah—pray—ah—proh—ah—pru.*
* ! *ay drah—ay—dree—ay—dray—ay—droh—ay—dru.*
* ! *ay—trah—ay—tree—ay—tray—ay—troh—ay—tru.*
* ! *ee—grah—ee—gree—ee—gray—ee—groh—ee—gru.*
* ! *ee—crah—ee—cree—ee—cray—ee—croh—ee—cru.*
* ! *oh—vrah—oh—vree—oh—vray—oh—vroh—oh—vru.*
* ! *oh—frah—oh—free—oh—fray—oh—froh—oh—fru.*
* ! *ah—blah—ah—blee—ah—blay—ah—bloh—ah—blu.*
* ! *ah—plah—ah—plee—ah—play—ah—ploh—ah—plu.*
* ! *ah—flah—ah—flee—ah—flay—ah—floh—ah—flu.*
* ! *ah—vlah—ah—vlee—ah—vlay—ah—vloh—ah—vlu.*
* ! *ah—clah—ah—clee—ah—clay—ah—cloh—ah—clu.*

In like manner the patient should gradually pass to more difficult combinations, and finally to reading poetry and prose. The instructor should guide every step, write out the exercises and mark the inspiration points.

Period of Treatment. On this subject there is a wide diversity of opinion and practice. Klencke's average time is 20 to 25 weeks, Chervin's but 14 days, Hunt considers that the time depends on the mental calibre of the patient, and that light cases may be cured in a month or six weeks. The general opinion seems to be that from 3 to 6 months of treatment is necessary in most cases; and that relapses occur most frequently in those which have made the most rapid progress while under treatment. Care and close watching are necessary on the part of the patient for a year or more after a cure has been effected.

The best age for treatment is undoubtedly the earliest, before the habit becomes confirmed. But if the affection is allowed to advance beyond this period it is best to postpone treatment until adult age, in order to gain the advantage afforded by steadier purpose, appreciation of the infliction, and greater force of the patient's will.

CONCLUDING REMARKS.

Drilling on test-words is not recommended; and should be particularly avoided when the affection is markedly intermittent in character. Every effort should be made to draw the patient's attention from his difficult sounds to the succeeding vowels.

No manual of exercises will be found applicable to all cases. The varieties are many; and each case should be studied and treated individually, especially with regard to the organic or mental influences present; the personal disposition, habits and idiosyncrasies of the

subject. Industry, patience, and above all, perseverance, are absolutely necessary to a cure, not only on the part of the instructor, but also of the patient.

Fixation of the attention, and education of the will, are common factors in all the methods of treatment used. The latter must be kept constantly in view, as a firm will is a powerful regulator of the nervous system. These two, with re-education of the faculty of speech, comprise the whole of the rational treatment of dyslalia.

A stutterer may sometimes be advantageously placed before a mirror while speaking, in order to study his own defects, as well as the proper movements for the enunciation of sounds.

Finally, utilize this fact, that even the most inveterate stutterers speak with comparative ease when alone.

LIST OF INSTITUTIONS.

The following list of reliable teachers may be useful to those physicians who desire to send patients to the care of specialists :—

New York City.—John Howard, 39 Union Square.
J. E. Suitterlin, 103 Waverley place.
Albany, N. Y.—E. S. Werner, 59 Lancaster St.
Philadelphia, Pa.—Julius Ashman.
Boston, Mass.—L. A. Butterfield, 90 Myrtle St.
Canada.—T. G. Sutherland, London, Ont.
Germany.—H. Klencke, M.D., Hanover.
E. Gunther, Neuweid.
Austria.—Dr. R. Coën, Vienna.
France.—M. Chervin, Paris.
England.—Rev'd H. F. Rivers, Hastings.

The traveling, advertising teachers, who claim to cure stuttering, are usually quacks pure and simple, and not to be trusted under any circumstances. A little correspondence or conversation with any of them will generally prove them to be as ignorant as they are unscrupulous. No honorable teacher will profess to have any secret method, or require any oath or contract on the part of a pupil not to divulge his system.

From this sweeping condemnation, I must in justice except one gentleman, Mr. G. Delon, a Frenchman, who has lately been traveling in this country, treating stutterers. He makes no pretensions to the title of "Doctor" or "Professor," and his method of treatment is based upon the best experience of the continental specialists. Knowing him personally, I am able to vouch for his zealous attention to his pupils, and for the rational nature of the treatment which he pursues.

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