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T H E

SCIENCE OF SPEECH.



BY

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THE VOLTA BUREAU,  
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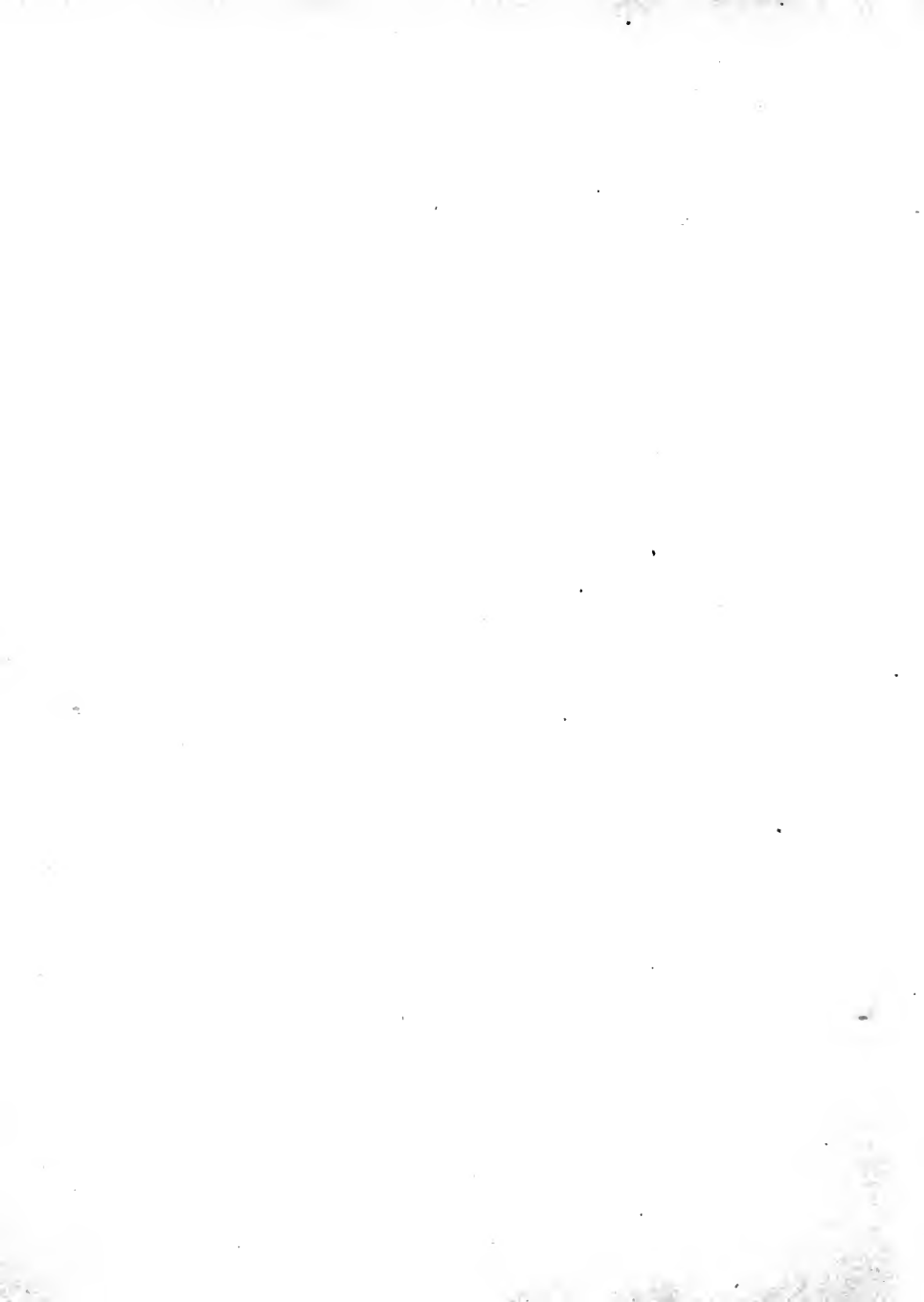
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## INTRODUCTION.

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In the present work an explanation is offered of all the actions of the mouth and the vocal organs which produce speech.

In the System of Visible Speech, the elements of languages are exhibited in *symbols*, which, to the initiated, are self-explanatory. That system may therefore be considered as a species of SHORTHAND FOR THE MECHANISM OF UTTERANCE. The present work describes the same elements, WITHOUT SYMBOLS; the formation of the sounds being fully expressed in their NOMENCLATURE.

Some beginners are apt to be repelled at sight of unknown symbols, under the impression that the latter must be difficult to learn. But this idea soon gives way, before the lucidity and simplicity of the exponent symbols of Visible Speech.

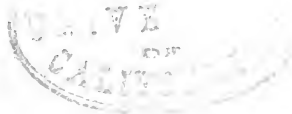
For the purpose of REPRESENTING language the symbols cannot be dispensed with—

forming, as they do, a Universal Alphabet—; but, for communicating a knowledge of the elements of languages, description may take the place of symbolism. Such is, at least, the hope of the author, in preparing this work. At present, a great part of the knowledge of linguistic science is locked up in the symbols of Visible Speech. This knowledge is now made accessible to all readers.

There is, undoubtedly, an advantage in being able to enter at once on a study without the necessity of first mastering a new medium of instruction. No such necessity exists in connection with the study of the Science of Speech, as here presented. The whole subject, from first to last, is expounded in ordinary language. This book may therefore be put into the hands of pupils in schools and colleges, without explanatory preparation. Some ready means of studying the Science of Speech has long been wanted. This little book is specially designed to furnish the means, and supply the want.

This work will also prove useful as an introduction to Visible Speech. Few teachers of Modern Languages have as yet taken the trouble to study that system, and apply it in their classes; although it would be found to be of unique assistance, in removing all difficulty from the mastery of foreign pronunciations. Nor have teachers in the Public Schools availed themselves, to any great extent, of the manifest advantages of the system for native learners. Only among teachers of the DEAF have the benefits of a training in Visible Speech been duly appreciated.

This backwardness to accept the help of such a phonetic instrument is, no doubt, to be largely attributed to the imaginary difficulty of learning the symbols. Here, only the *meaning* of the symbols is taught. Representation of sounds is everything in "Visible Speech." In the "Science of Speech" DISCRIMINATION is all, and representation is nothing.





# THE SCIENCE OF SPEECH.

## VOWELS.

The question has been often asked: "How many vowels are there?" It might as well have been: "How many colors are there?" We have shades of red, and green, and violet; and compounds of each, with any, or all, of the others; and every tint may be, to a greater or less extent, diluted with white or with black; so that the total number of recognizable varieties is practically beyond computation. So with vowels.

### *Back, Top, and Front Vowels.*

Certain vowels receive their color, or characteristic quality, from the back of the tongue, directed to the back of the mouth; certain others from the top of the tongue directed towards the roof of the mouth; and



a third set from the front surface of the tongue directed to the front of the mouth, or the alveolar arch.

Each of these three sets is subject to further modification by contraction of the aperture of the mouth—the lips. We have thus four varieties of vowel “color,” produced by the back, the top, and the front of the tongue, and by the lips.

The lips have no independent action in vowel formation. They merely modify the effect of lingual action. In forming Back, Top, and Front vowels the lips should be kept out of the way; so as to preserve the series of unlabialized vowels distinct from the series of labialized vowels. For labialized vowels, the lips cover the teeth to a greater or less extent. For unlabialized vowels the teeth are visible. This criterion should be a convenience to the learner.

#### *Labialized Vowels.*

Any lingual vowel may be labialized, and any labialized vowel may be delabialized, by

spreading the lips apart, while the tongue maintains its position unchanged. In this way, a learner gains perfect command over the whole gamut of vowels; and even produces, with certainty, sounds which he may never have heard before he utters them.

*High, Mid, and Low Vowels.*

Now bear in mind the three radically different vowel colors produced by the back, the top, and the front of the tongue, and we shall be prepared for another step in vowel classification.

The vowel *Ee* is a Front vowel; and it has the tongue RAISED within the palatal arch, in the highest possible degree, consistent with the maintenance of a free channel for the sound. But the TOP of the tongue may be equally raised, toward the roof of the mouth, forming, as it were, an *ee* at the middle of the tongue. And the BACK of the tongue may be equally raised, towards the back of the mouth, forming, as it were,

an *ee* at the back of the tongue. We have thus, clearly discriminated, three HIGH vowels,—High Back, High Top, and High Front.

*Delabializing Vowels.*

To show the directive effect of these relations of sound to sound, take an example:

The High Back vowel is a Gaelic sound, which has probably never been heard by nine-tenths of those who may read these words; yet, this unheard sound will be produced, with uniformity, by every person, at the first effort. Proceed thus: Sound the vowel *oo*, and, while doing so, separate the lips with finger and thumb; and, instead of *oo*, the High Back vowel will be heard.

The technical name of the vowel *oo*—High Back Round—explains the mechanism of the sound. The tongue is in the High Back position, and the sound is labialized. Separating the lips delabializes the sound, and thus the pure High Back vowel is involuntarily produced.



*Nine Vowels.*

The tongue may maintain its back, top, or front presentation at any degree of elevation within the mouth. Perfectly definite vowel "colors" are obtained at the three elevations: High, Mid, and Low. High vowels have the tongue nearest to the palate; and therefore the cavity of the mouth is of minimum size: LOW vowels have the tongue most depressed from the palate; and the cavity of the mouth is therefore of maximum size: MID vowels have the tongue about midway between High and Low. Our three organic vowels—Back, Top, and Front—have now become nine; each of them individualized to the mind, and absolutely located in the mouth; namely:

High Back,	High Top,	High Front
Mid Back,	Mid Top,	Mid Front
Low Back,	Low Top,	Low Front

*dark back*

*flat & by min*

*straight & tall*

*Primary and Wide Vowels.*

There are two phonetic varieties of each of these nine vowels: (1) the primary, or most definite in quality; and (2) the Wide, or comparatively indefinite. The High Front vowel is ee(l); and the High Front Wide vowel is i(ll). To continue the color analogy: Suppose the High Front vowel to be a pure red, then the High Front Wide vowel will be red dulled with a neutral tint. The nature of this neutral quality, which changes Primary vowels into their Wide counterparts, may be understood from the explanation, that, behind the aperture of the primary vowel, the cavity of the mouth is expanded for Wide vowels, so as to weaken the organic quality of the sound, whether Back, Top, or Front.

*Eighteen Vowels.*

Every Primary vowel has its Wide congener; therefore the nine vowels already introduced, at once become eighteen,—nine Primary and nine Wide. The nomenclature

of these sounds will give a clear conception of the mechanical cause of each variety. Thus:

High Back  
High Back Wide  
Mid Back  
Mid Back Wide  
Low Back  
Low Back Wide  
High Top  
High Top Wide  
Mid Top  
Mid Top Wide  
Low Top  
Low Top Wide  
High Front  
High Front Wide  
Mid Front  
Mid Front Wide  
Low Front  
Low Front Wide

*A Vowel Discovery.*

The distinction between Primary and Wide vowels is one of the discoveries of Visible

Speech. I had been haunted, for years, by a sound, which I was constantly hearing from Scotch speakers, but which would not fit into any of my experimental Tables. It was *like* the Mid Front, and also like the Low Front; but was not exactly either; nor was it an intermediate sound. The difference was ultimately discovered to lie in the enlargement of the cavity *behind* the aperture of the Mid Front vowel. This became the key to the entire vowel scheme. In fact, but for this discovery, the System of Visible Speech could not have been invented. The erratic vowel, thus at last fixed in its true location, is the Mid Front Wide vowel—a common Scotch sound, heard in *ill, yes, her*.

The general characteristic of Wide vowels has been stated to be, comparative weakness of organic quality—that is, of Back, Front, or Top “color.” This will be manifest by comparing the Primary and the Wide sounds in the following Front vowels.

*Sounds of Front Vowels.*

High Front.....	eel
Mid Front.....	ale
Low Front.....	ell
High Front Wide.....	ill
Mid Front Wide.....	ill (Scotch)
Low Front Wide.....	an

*Back Wide Vowels.*

Back Wide vowels have a clearer sound than their primaries, because the guttural quality of the latter is necessarily lessened by the widening of the resonance cavity. Thus the Low Back Wide vowel, *ah*, is distinctively the purest in tonality of all vowels, because freest from friction. The vowel *aw* depresses the root of the tongue a little more, so as to direct the sound against the lips; but, keep off labial quality, and, stretch the organs how you will, you cannot get a lower tongue-attitude than that for *ah*.

*Sounds of Back Vowels.*

High Back . . . . . laodh (Gaelic)

Mid Back . . . . . up

Low Back . . . . . up (Scotch)

High Back Wide . . -tion

Mid Back Wide . . . ask

Low Back Wide . . ah

*Uncovering Lingual Vowels.*

Just as the High Back vowel is uncovered by the delabializing of *oo* (see page 12) so the Mid Back vowel is obtained by delabializing *o*; and the Low Back vowel by delabializing *aw*.

The student should repeat all these experiments in order to satisfy himself of the reality of the relations.

*Sounds of Top Vowels.*

High Top . . . . . er, ir, ur (Amer.)

Mid Top . . . . . (ohn)e (German)

Low Top . . . . . zur (Prov. Eng.)

High Top Wide . . er, ir, ur (Amer.)

Mid Top Wide . . . (sof)a

Low Top Wide . . . err, her, sir

The Top vowels are phonetically associated with the letter R. The High Top and High Top Wide are heard in the American pronunciation of *er*, *ir*, *ur*; the Low Top is a Provincial English variety; and Low Top Wide is the ordinary English pronunciation of *er*, *ir*, *yr*. Mid Top and Mid Top Wide are the sounds, respectively, of unaccented *e*, in German, and *a*, in English.

*The Natural Vowel.*

The Mid Top vowel has been called—not inaptly—the *natural* vowel, because the tongue is central in the mouth, with neither Back, Front, High, nor Low modification.

*Round Vowels.*

The formation of eighteen vowels has now been explained, and their verbal usage illustrated. Each of these sounds is susceptible of being “Rounded” or labialized. And here a principle of symmetry prevails. In proportion to the height of the tongue within

the mouth, is the narrowness of the aperture between the lips. Thus High Round vowels have the smallest lip aperture; Mid Round vowels have a medium lip aperture; and Low Round vowels merely have the corners of the lips rounded off. The three degrees of labial aperture are exemplified in the vowels

*oo, o, aw.*

*Thirty-six Vowels.*

By adding symmetrical labial modification to each of the eighteen vowels already described, the number of vowel elements is increased to thirty-six. For all practical purposes, this number has proved to be ample; but, theoretically, the gamut of vowels might be extended, if desirable for any purpose, by recognizing more than three divisions between High and Low, and between Back and Front. Labialized vowels might also be further increased by recognizing non-symmetrical labialization—such as narrow lip aperture with Low vowels, and broad lip



aperture with High vowels. These speculative classifications are merely indicated here, as possibilities. Their use would require an auricular perception, and an oral precision of utterance, far beyond the capability of average speakers or students.

*Guttural Rounding.*

Round vowels will now be understood to be symmetrically labialized lingual vowels. It is possible to imitate the effect of labial modification by *guttural* contraction. This expedient is employed by ventriloquists, who speak without visible use of the lips; but we may dismiss non-labial rounding with mere mention, as beyond ordinary requirements. Labial modification is, normally, something that may be added to a lingual vowel without affecting its formation; or that may be removed from a round vowel without altering the position of the tongue.

The labializing of vowels may be experimentally illustrated by means of the hand

on the mouth. Put the fingers of the right hand on the left cheek, or of the left hand on the right cheek, and gradually cover the mouth with the hand while you sound *ah*. The quality of the vowel will be changed by every movement of the hand; becoming, in succession, *aw o oo*. This experiment proves that merely a diminished labial aperture is required, to form from *ah*, the sounds of *aw*, *o*, *oo*; and that, consequently, there is no need for the pouting of the lips which is so ungracefully common.

*Sounds of Back Round Vowels.*

High Back Round.....	pool
Mid Back Round.....	soul
Low Back Round.....	all
High Back Wide Round....	pull
Mid Back Wide Round.....	soar
Low Back Wide Round.....	or

The Back Round vowels are all English sounds, and they are perfectly discriminated in general usage.

v *Sounds of Top Round Vowels.*

- High Top Round . . . . . ü (N. Ir.)  
 Mid Top Round . . . . . homme (French)  
 Low Top Round . . . . . ü (Ir.)  
 High Top Wide Round.  
 Mid Top Wide Round..  
 Low Top Wide Round.. out (London)

The Top Round vowels are, for the most part, dialectic sounds, some of which are not, as yet, definitely associated with linguistic key-words.

*Sounds of Front Round Vowels.*

- High Front Round . . . . . ü (Ger.)  
 Mid Front Round . . . . . û (French.)  
 Low Front Round . . . . . ö (Ger.)  
 High Front Wide Round. gude (Scotch.)  
 Mid Front Wide Round...  
 Low Front Wide Round..

The Front Round vowels are all foreign sounds, but their Primary forms are, in general, well discriminated, and fixed in usage.

Thus the High Front Round vowel has the tongue in the position for *ee* and the lips in the position for *oo*. The Mid Front Round vowel has the tongue as for *ā* and the lips as for *ō*; and the Low Front Round vowel has the tongue as for *ä* (Ger.) and the lips as for *aw*.

The student should exemplify these facts, by delabializing *ü*, *ú*, *ö*. In this way he will uncover the High, Mid, and Low Front vowels.

The High Front Wide Round vowel has the tongue as for *ǐ* and the lips as for *oo*. This sound is heard in the pronunciation of the word *gude* (Scotch). Representative words in French or German will, no doubt, be found for the other Front Wide Round vowels, when native orthoepists undertake the investigation. Meantime the student should remember that the SOUNDS ARE REALITIES; and he should be able to produce them, irrespective of keywords, from the data furnished in these pages.

*Good Pronunciation.*

All who aim at a good pronunciation will be careful to preserve the minor differences in vowel sound. Nothing can be more pleasing to the ear than a clear phonetic syllabication, in which every element is perfectly individualized. This quality of beautiful speech is a rare and distinguishing mark of refinement. But with this distinctiveness must go correctness; which can only be attained by training, study, and observation. A Table of English elements will be found at page 50. These should all be practised until the ear can recognize, and the operating organs can satisfactorily reproduce, every variety.

**GLIDES.**

Vowels are syllabic sounds; that is to say, every vowel makes a syllable; but the vowel may be changed in quality without making a new syllable; the radical sound may slide towards another position at the close of the same syllable.

*English Glides.*

Thus we have a series of GLIDES, or non-syllabic vowel-like sounds, which play a very important part in pronunciation. The diphthongs *I*, *Oi*, *Ow*, unite an open radical vowel with a gliding approximation to the closest vowel positions, *ee* and *oo*; and the syllables *air*, *ear*, *ire*, *ore*, unite their respective radical sounds with the vowel-like quality of *r*. Any radical vowel may be united with any other terminal quality, as a Glide; but the English Glides are only three in number, namely, approximations to the sound of Y, (ee,) W, (oo,) and R, (er).

The reader will distinguish between these articulative Glides and vocal inflections. The latter are slides of the voice from one *pitch* to another. The Glides here described are transitions from one *position* to another of the oral organs.

The name-sounds of the letters A and O are, in Anglican usage, pronounced with glides: Thus, A *ee*, O *oo*.

## CONSONANTS.

To feel, and to make manifest, the difference between a vowel and a consonant, let the student perform the following experiments:

1. Prolong the sound of the vowel *ee*, and, while doing so, strike the tongue momentarily upwards with the point of a finger, from below the chin, and the sound

*ee ee ee ee ee*

will be changed to

*ye ye ye ye ye,*

at every impact of the finger.

2. Prolong the sound of the vowel *oo*, and, while doing so, gently strike the lower lip upwards with the point of a finger, and the sound

*oo oo oo oo oo*

will be changed into

*woo woo woo woo woo,*

at every impact of the finger.

From these experiments we learn that the oral channel of a vowel has a fixed configu-

ration, through which the voice issues unobstructedly from the throat to the oral aperture; while the oral channel of a consonant is constricted or obstructed at some part, so as to produce an organic flap in passing from one position to another, or to cause a degree of friction on the passing breath. Vowels, then, are throat-sounds which are merely moulded, by the shape and direction of their oral channel, into Back, Top, or Front formations; but Consonants have a superadded effect, originating in the *mouth*.

The organic identity of the sounds *Ee* and *Y*, and *Oo* and *W*, accounts for the confusion into which orthoepists have been led in classifying these elements. *Y* is *ee*, and *W* is *oo*, with organic compression added. Remove compression from *Y* and *W* and these elements are vowelized into *ee* and *oo*; add compression to *ee* and *oo*, and these elements are consonantized into *Y* and *W*.



*Sounds of R.*

Other vowels may be consonantized, and other consonants may be vowelized. The sounds of R illustrate both these conditions. Before a vowel R is consonantized, and before a consonant R is vowelized. The sounds of

V, Dh, Z, Zh, L

may all be vowelized, by pronouncing them without friction. And this is a common source of indistinctness. Consonants depend on their fricative or their flapping quality for clearness of utterance.

*Experimental Exercise.*

We have seen that the High Front position of the tongue yields the consonant Y, and that the High Back position, labialized, yields the consonant W. But the same Back position, unlabialized, will yield another consonant. The student will form the latter by delabializing oo, and consonantizing the resulting vowel.

The three Back positions which, when labialized, yield the vowels *Oo O* and *Aw* will also yield three unlabialized consonants, formed at the High Back, Mid Back, and Low Back positions. The student should exemplify each of these elements. Although they do not all occur in English speech, they should be formed experimentally, to give control over the organs, and to qualify the speaker for the mastery of the mouth.

*Sounds of German ch.*

The sound of *ch* in *nach* (German) is a Back consonant, formed by squeezing the breath between the Back of the tongue and the soft palate; and the sound of *ch* in *ich* (German) is a Front consonant, formed by squeezing the breath between the front surface of the tongue and the upper gum. Sometimes the latter sound is formed farther back, or nearly at the Top of the tongue. The necessities of assimilation between proximate elements—as well as the habits of individual

speakers—will often thus vary the precise point of an articulation.

*Voice Consonants.*

Each of the organic positions hitherto described, yields a second consonant when the formative breath is vocalized. Thus, pass VOICE fricatively over the back of the tongue, and you hear the Back Voice consonant Gh or smooth guttural R. Pass voice fricatively over the point of the tongue, and you hear the Point Voice consonant R.

*Mixed Consonants.*

Consonants called MIXED have the breath or the voice modified simultaneously at two parts of the mouth. Thus the Top Mixed consonant (Sh-Zh) has the Top of the tongue raised, while the Point is also raised subordina- tely;—so that the fricative quality is developed over the *Top* of the tongue. The Point Mixed consonant (S-Z) has the Point raised, while the Top is also raised subordi-



nately;—so that the fricative quality is developed over the *Point* of the tongue. The sound of Wh—W is Lip Mixed (with Back), with the fricative quality on Lip. A guttural sound, heard in *sough* (Scotch), is Back Mixed (with Lip) with the fricative quality on Back.

#### *Divided Consonants.*

The principle will now be understood which forms either a vowel or a consonant from any given position of the tongue. All the elements hitherto introduced have a centre-aperture for the emission of the breath or voice; but there are other fricative consonants which issue through side-apertures, while the central passage is stopped. These are called Divided consonants.

#### *Sounds of Divided Consonants.*

Back Divided is a Gaelic sound, not easily formed by unaccustomed organs. The centre of the back of the tongue touches the

soft palate, while the voice issues over the sides of the tongue. Top Divided has the convex tongue raised within the palatal arch, while the sound passes through high side-apertures, as in *gli* (Ital.). Point Divided (L) has the flattened point of the tongue laid on the upper gum, while the breath passes over the free sides of the tongue.

The apertures for L are so large that the voice passes through them without friction. This consonant, therefore, has a vowel-purity of vocality. Hence it is often used to form a syllable without a vowel, as in

*little, middle, etc.*

By contracting these large side-apertures of Point Divided (L) a lateral hissing or buzzing effect is produced, as heard in Ll (Welsh) and in the vocalized form of the same articulation—a Zulu sound of L.

Point Mixed Divided—(Th-Dh)—has the tip of the tongue touching the teeth (or the gum), leaving interstitial apertures over the

sides of the *tip*, while the middle of the tongue is spread out, to prevent issue over any other part of the tongue.

Point Mixed (S) and Point Mixed Divided (Th) have in all respects the same attitude of the tongue, save for the contact of the tip for the latter. Divided formation may take place at any part of the mouth. We have already seen

Back Divided (Guttural L)

Top Divided (gl)

Point Divided (L)

Point Mixed Divided (Th-Dh)

and now we have to include

Lip Divided (F-V)

For this latter articulation the lower lip touches the edges of the upper teeth, while the breath or voice passes through lateral interstices between the lip and the teeth.

*Exercise.*

The student should make himself perfectly familiar with the difference between centre-emission and side-emission, by alternating the following sounds without vowels:

s th	s th	s th	s th
z dh	z dh	z dh	z dh
wh f	wh f	wh f	wh f
w v	w v	w v	w v
r l	r l	r l	r l

*Shut Consonants.*

Another series of consonants results from complete stoppage of the mouth-passage. Thus: Back Shut means closure of the back of the tongue on the soft palate (K-G); Top Shut means closure of the top of the tongue on the roof of the mouth (Palatal T-D); Point Shut means closure of the forepart of the tongue on the alveolar arch (T-D); and Lip Shut means closure of the lips (P-B).

The sounds of these shut consonants are,

of course, incapable of prolongation. Their vocalized forms (G D B) are, therefore, heard only as momentary murmurs; and their non-vocal forms (K T P) receive their only audibility from the act of removing the organic contact. Thus the pronunciation of the word "stop" does not end with the closing of the lips, but with their separation after contact. This separation is generally further audible in the little puff which results from previous compression of the breath.

*A Principle of Organic Action.*

This principle of organic separation, as a part of consonant action, applies to fricative as well as to shut consonants. The rule may be laid down thus: A consonant consists of two parts—a position and an action; the position, one of conjunction—the action one of separation:—and both are necessary to perfect articulation.



*Nasal Consonants.*

Each of the shut positions yields a Nasal consonant. The oral channel being entirely closed, the top of the soft palate is depressed and the breath or voice flows freely behind it, into the nose.

In their non-vocal forms the nasal consonants have but little audibility because of the absence of compression, and consequently of fricative quality; but in their vocal forms the nasals are, from the same cause, as purely sonorous as vowels. Thus the sound of *n* is often used to form a syllable without a vowel; as in

*given, dozen, eaten, &c.*

The Nasal consonants are :

Back Nasal.....	n	in ink
Top Nasal.....	—	
Point Nasal.....	n	in front
Lip Nasal.....	m	in tempt
Back Nasal Voice .	—	ng
Top Nasal Voice..	—	gn (French)
Point Nasal Voice.	—	n
Lip Nasal Voice...	—	m

*Nasalized Vowels.*

Vowels immediately before or after nasal consonants are very apt to be nasalized; and the nasalizing habit is not infrequently extended to vowels in all positions. To cure this tendency, the ear must first be made conscious of the difference between a purely oral and a partially nasal sound. Then, the learner should make a slight break between nasal consonants and adjoining vowels, until the requisite power of fluent sequence is attained.

English Nasals are purely nasal, but all English vowels should be purely oral. The French elements *en*, *in*, *on*, etc., are semi-nasal vowels, the sound being emitted partly through the mouth, and partly through the nose.

*Test for Nasality.*

The student can easily test himself, and find out whether his vowels are nasalized, by repeatedly pressing his nostrils while he

prolongs a vowel sound. If the voice is purely oral, pressure on the nostrils will have no effect; if the voice is in any degree nasalized, a pulsation of the sound will inform him of the fact.

### *Throat Consonants.*

Contraction of the throat-passage above the glottis, creates a friction on the breath which is heard as an element of speech (vocalized) in *Ghain* (Arabic). The name of this element is Throat; when vocalized, Throat Voice; when nasalized, Throat Nasal, and Throat Nasal Voice.

### *Pseudo Voice.*

The throat sound is also heard as a pseudo voice, in growling, and in strong stage whisper. These effects are produced by vibration of the epiglottis. Another semi-vocal crackling sound is formed in the glottis as a pseudo voice; that is, a sound on which articulation may be based. This has a choking effect.

*Throat Shut.*

Closure of the throat-passage creates an element which is used in some dialects as a substitute for *k*. This is the same effect which is heard at the commencement of a cough. French phoneticians call it *coup de la glotte*. The name of this element is Throat Shut. Of course this sound cannot be vocalized, because it has no issue of breath.

*Aspirate—H.*

A frictionless emission of breath through the open throat is the effect of the Aspirate H. H may be considered as a non-vocal form of all vowels, because the position of the mouth is assimilated to that for the vowel that follows the *h*. Thus *h* before *e* may be called a *formative e*, before *o* a *formative o*, etc.

*Whisper.*

Such formative vowels are silent, because the throat passage is too open to give fric-

tional audibility to the breath. True non-vocal vowels receive a degree of compression in the throat which renders them distinctly audible. This effect is called *Whisper*.

### *Trills.*

When the organ acted on by the breath is lax and free to vibrate, it is made to shake and rattle. Thus the throat yields a trill—of the epiglottis; the soft palate yields a trill—of the uvula; the forepart of the tongue yields a trill; and the lips yield a trill. These are called *Throat Trill*, *Back Trill*, *Point Trill*, and *Lip Trill*.

### *Clicks.*

In ordinary utterance the breath is in continuous outward flow, with momentary interruptions from shut positions of the mouth; but the elements called *Clicks* are *suctions*. The breath is held in, either at the throat, or by a *Back* position of the tongue, while the anterior organs—the forepart of the tongue and the lips—move suctively from shut po-



sitions. The resulting sounds are elements of speech, in Zulu and other African tongues.

*Interjectional Clicks.*

The Clicks are also used by ourselves, as Interjections. Thus the Top Click and the Point Click are common expressions of impatience or annoyance; the Side Click is used to incite a horse to motion; and the Lip Click is used as a call to a dog. The latter is also familiarly heard in the act of osculation. In linguistic use the Clicks offer no more interruption to the flow of voice than do our p's and t's and k's.

*Teaching the Deaf.*

Students of Articulation, and especially the Deaf, are very apt to give undue prominence to the different organic actions. Speech is thus made heavy and labored; and fluency is the last quality acquired. The opposite order should be the aim of instruction, namely, to give fluency first,

and leave accuracy to the last. A prattling infant may be taken as the best model for a beginner, in the Art of Speaking. The infant makes a continuous sound, and moves his lips and tongue at random. This babble is fundamental speech. It only needs to be regulated, and conventionized to become intelligent language.

*Fluency.*

So, a deaf learner should first be taught to make a continuous sound, of any vowel quality, and, with lip and tongue in random motion, make all possible changes, until the relation, and the difference, between voice and oral action is felt and understood. Then will be the proper time to begin a discrimination of the elementary actions, and to teach them as parts of speech.

But, remembering that the formation of Shut consonants, and even of Suction Clicks, does not interfere with the continuity of voice, let the student ever keep this con-

tinuity in view, in his efforts to master any of the details of articulation. In practising on a new element, for example, let him first “babble” it on a stream of vocal sound, and so secure fluency as the primary requisite.

### *Impediments of Speech.*

The babbling exercise described in the preceding section is one of the most useful in removing impediments of speech. These impediments—called Stuttering and Stammering—are interruptions of vocal continuity, accompanied by stoppages of breath, pressures, and suction, such as are legitimately used in speech, but which become faults, when they are obtruded obstructively, on the pathway of vocal sound.

The action of the oral organs in speech should be from close to open positions—that is, from consonant to vowel; so that the vowel sounds are practically continuous, and the consonant sounds are only momentary transitional interruptions.



In stammering and stuttering, the action of the organs is from open to close positions—that is, from vowel to consonant; and the organs thus brought into contact are pressed together, so that voice can find no egress; or they start off, jerkingly, and repeat the act of contact again and again, before a steady channel for the voice can be obtained.

These faults of speech are mainly *habits*, which can be corrected by training. A knowledge of the Science of Speech is the best director of efforts to remove the impediments.

#### *Articulative Defects.*

Other defects of speech—such as Lispering, Burring, Lallation, &c.—consist merely in the substitution of one organ for another, or one mode of organic action for another. The most common of these defects are: Guttural instead of Lingual vibration for R; Divided, instead of Centre, emission, for hissing sounds—as *th* for *s*; Point, instead of Back,

Shut positions—as *t* for *k* ; Non-vocal instead of Vocal formations, or vice versa ; Nasal instead of oral emission ; Obstructed nasality, &c All these errors, save in the rare cases of congenital malformation, are susceptible of perfect correction.

*Management of the Breath.*

Breath being the material of speech, the management of the breath is a matter of first importance, to the health, comfort, and vocal power of the speaker. There is no suction needed to fill the chest with air. The bony framework has only to be raised, and *atmospheric* pressure will immediately fill up the cavity so created within the chest.

Students, both of speaking and singing, have been bewildered and misled by erroneous teaching in regard to vocal respiration. Raise the chest, and *keep it raised*, and you need not think of the breath at all. It will attend to itself.

The chest may be considered as a curtain-

rod, from which the abdomen hangs as a curtain. Keep the rod high, and the curtain entirely passive, so that it may be free to move, inward or outward, independently of the chest: Or, consider the chest as a frame of cast-iron, incapable of motion, whose whole function is to support the soft organs pendent below it; and, if the throat-passage to the lungs be but open, the breathing will be easy, regular, silent, and full, without effort. Speaking and singing, so conducted, are among the most healthful of exercises.

*Articulative Impulse.*

Speech uses very little breath. The throat-passage in the glottis is contracted to a mere fissure in the formation of voice; and there is so little waste, that the speaker's pauses are as much to let off superfluous breath, as to replenish the lungs. Then, consonants are often mere motions, which involve scarcely any expenditure of breath. | And, besides, the impulse of articulation

does not come from the chest, but from the pharynx; and affects only the breath within the mouth. Any amount of compression and percussion may be given by the pharynx to the confined breath; so that emission from the lungs is not necessary to the audibility of consonant actions.

This last fact is one on which the reader may well ponder. The firm extrusive impulse of the pharynx, which it implies, is a power that may be new to him in theory, but which will prove its reality by cultivation.

#### *Expulsive Clicks.*

The consonant actions,—*p*, *t*, *k*,—may be formed with strong explosiveness, without emission from the lungs; thus producing a series of what may be called *expulsive clicks*, in contradistinction to *suctive clicks*.

#### *Articulation in Singing.*

All that has been said here, in reference to the articulation of speech, applies equally to the articulation of song. We ought to

hear the singer's every *syllable*; and that without the slightest detriment to his vocalization. One who does not articulate his words is a mere Instrumentalist upon the Larynx, and

NOT A SINGER.

An exercise for the development of pharyngeal power will form a fitting conclusion to this treatise.

*Pharyngeal Exercise.*

Hold in the breath at the throat, and read, without issue of either voice or whisper. All the actions of articulation—including even the organic separations of *m, n, l, f, th, s, &c.*—should be audible, *without throat-sound of any kind*. After a little practice, this voiceless mouth-reading should be fairly intelligible to a near-by listener;—although words containing only *h* and *vowels* will yield no audible effect. The next and culminating step will be, to unite this crisp articulation with vocality, and so, form that rare specimen of scholastic art,

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— High Front.....	eel
High Front Wide.....	ill
Mid Front with Y glide.....	ale
Mid Front Wide with R glide.....	air
— Low Front.....	ell
Low Front Wide.....	an
Mid Top Wide.....	a (article)
Mid Back Wide.....	ask
Low Back Wide.....	ah
Low Top Wide with R glide.....	err
Mid Back.....	up
Low Back Wide Round.....	doll
Low Back Round.....	all
Mid Back Wide Round with R glide.....	ore
Mid Back Round with W glide.....	old
High Back Wide Round.....	pull
High Back Round.....	pool
Mid Back Wide with Y glide.....	isle
Mid Back Wide with W glide.....	owl
Low Back Wide Round with Y glide.....	oil
Y and High Back Wide Round with R glide.....	cure
Y and High Back Round.....	cue

<i>Consonants.</i>	<i>Key- Words.</i>
Back Shut.....	speak, keep
Back Shut Voice.....	beg, get
Back Shut Nasal Voice.....	song
Front.....	hew
Front Voice.....	yew
Top Mixed.....	ash, she
Top Mixed Voice.....	rouge, giraffe
Point Voice.....	errand, run
Point Divided Voice.....	all, law
Point Shut.....	eat, tea
Point Shut Voice.....	add, day
Point Shut Nasal Voice.....	own, no
Point Mixed.....	ace, say
Point Mixed Voice.....	ease, zeal
Point Mixed Divided.....	oath, thin
Point Mixed Divided Voice.....	with, then
Lip Divided.....	safe, fail
Lip Divided Voice.....	save, veil
Lip Mixed.....	wheel
Lip Mixed Voice.....	weal
Lip Shut.....	ape, pay
Lip Shut Voice.....	ebb, bed
Lip Shut Nasal Voice.....	aim, may
Aspirates.....	hay, he, high, hoe, who, how, hoy
Point Shut and Top Mixed.....	each, cheek
Point Shut and Top Mixed Voice.....	edge, gem
Back Shut and Point Mixed.....	expect
Back Shut and Point Mixed Voice....	exalt





## INDEX.

The following Index will be useful in furnishing a basis for questions in the examination of learners. For example :

- What is the organic cause of vowel quality ?
- What is a Back vowel ?
- What is a Top vowel ?
- What is a Front vowel ?
- What is meant by delabializing a vowel ?  
    &c., &c., &c.

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