

FORMATION AND DEVELOPMENT  
OF  
ELEMENTARY ENGLISH SOUNDS

Formation and Development  
OF  
Elementary English  
Sounds

BY  
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## INTRODUCTION

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An able and experienced teacher of both deaf and hearing children writes, "Arguments for a phonetic method of teaching reading are happily no longer necessary. No one who has followed the progress of educational thought in recent years pretends to believe that the mere memorizing practiced under the 'word' and 'sentence' methods is of any real educational value, however successful it has been and is in teaching defenseless pupils to read. Normal children have fortunately a happy faculty of absorbing information even under the most unfavorable conditions; and manage somehow to educate themselves more or less in spite of antiquated and unscientific training.

It is true that attempts to teach the reading of English by phonetic methods have not infrequently met with discouraging results, but it has been largely because of a lack of sound training in phonics among the originators and teachers of the methods pursued. A system of phonics which teaches that *e* is silent in *hate, kite, note* and that marks the vowels in these words 'long' with total disregard for the fact that the vowel sound in each of these words is really a diphthong and requires both letters to represent it, can hardly prove a safe guide to young people struggling with the mysteries of English pronunciation. Such inaccurate work in phonetics would certainly never meet with success in the difficult work of teaching the deaf to speak. The obstacles to be overcome compel the teacher of the abnormal child to economize effort, and thus it happens, not infrequently, that the special school develops methods in advance of those in use among teachers of normal children."

In its early days the Clarke School appealed to teachers of reading to train pupils to use "reason and judgment" instead of memorizing. But it is only comparatively recently that teachers of normal children have shown any just appreciation of the need of such a method or any realization that in changing from the old a-b-ab to the word method they had really taken a step backward when a single step forward from that old point of vantage would have given them the sound of the letter instead of its name, thus developing a phonic method.

In 1871, Alexander Graham Bell—now an acknowledged authority in all scientific circles—came to this country to introduce to teachers of the deaf his father’s system of phonetics then known among students as Visible Speech. This was a system of universal alphabets devised by Alexander Melville Bell, each character of which was based on the physiological formation of the sound which it represented, and therefore any sound which the organs of speech could utter, its symbols could represent. This system had been originally devised as an aid in acquiring foreign languages, but later its inventor conceived the idea that it might be of use in teaching the deaf to speak. The knowledge which the careful study of phonetics from this physiological standpoint gave to the teachers of the deaf of that day was an invaluable aid. Unquestionably, no other line of study could have laid so sure a foundation for the teaching of speech to deaf children.

For ten years Visible Speech charts of the consonant and vowel elements, grouped according to correspondence in formation, were used in all teaching of speech and reading in the Clarke School. After this long trial of the method it was decided to modify it by substituting on the charts the characters of the English alphabet for those of Visible Speech, retaining, however, the same scientific arrangement. The chief difficulty in making this change was the poverty of our alphabet which gives us only twenty-six characters with which to represent the forty odd elementary sounds of the language. The effort to overcome this difficulty resulted in a set of representations of elementary sounds devised by Miss Alice E. Worcester at that time Special Teacher of Speech in the school. In a pamphlet entitled, “Pronunciation at Sight,” published in 1885, Miss Worcester stated her objections to the use for young children of either Visible Speech symbols or diacritical marks and described the method she had devised. The charts published in the little pamphlet of 1885 show little resemblance to those in use in Clarke School to-day, but a careful study of both will reveal the fact that the underlying principles are the same in spite of the changes resulting from nearly thirty years of added experience in speech teaching in the school.

We quote Miss Worcester’s own clear explanation of her simple but scientific device:

“Considering that written language as it meets our children in daily life comes only in the form of letters and combinations of letters, my effort has been to see how far it might be possible to lay aside all marks and symbols and to deal directly with the problem in the form under which it presents itself. It does, indeed, seem essential to have some standard representative for

each English sound. It is from this need, of course, that marks and symbols have arisen,

I. As far, then, as I have been able to discover any unfailing letter or spelling which gives one of these sounds, I have used it as the foundation of work upon each. These stand first in each group upon the Chart. Where not even one invariable representative has been found for a given sound, one of those most common is meant to stand in this place. But next, and more needful, perhaps, has been the attempt—

II. To make letters *mark themselves* for pronunciation, to the greatest possible extent, by their position in words and their connection with other letters. Take for example the sound of long *a*. The simplest and most nearly invariable rule for its pronunciation is that for monosyllables ending in ‘silent’ *e*. When this vowel sound is taught as an element, therefore, it is first represented to the pupil in this way: *-a-e*. Work upon combinations at once fills these blanks with consonant letters in endless variety:

	-a-e
	c k
	-a-e
	pl t
	-a-e
	f c
	-a-e
	n m
	-a-e
	etc.

The quick teaching of the child’s sight, which shows him that the relative position and connection of the ‘—a—e’ remain unaltered, whatever the letters may be which fill the other places or however they may be changed, makes its pronunciation a matter of established fact to him very speedily. Again, *a*, in a similar position without the *e*, has always its short sound. Representing this element, then, by the position of the letter which produces it,—a—, the child fills blanks as before:

{ -a-  
 c t  
 -a-  
 m n  
 -a-  
 th t  
 -a-  
 etc.,

seeing, more and more clearly, that the unchanging *a* is left always in a position which will, in the future, carry its own pronunciation with it to him. So with *i* and *y*. So, (though with more exceptions in the case of the long sound,) with *o*. The child will see these letters in these relative positions all his life, where he will see neither marks nor symbols. He has no small advantage, then, in being independent of such helps. For, to just such an extent as these rules apply, the pronunciation of written language becomes not an act of memory, but of sight. It is true, indeed, that there is scarcely a rule for English spelling that is not 'proved by its exceptions,' many or few! But, under this method of teaching, the work of memory is reduced to its minimum. A child who *knows* that, in general, the position of certain letters in words tells him their pronunciation, has only to *remember* the exceptions to his rules a very different and much lighter matter. I cannot speak too strongly upon this point. Would that we had a spelling which made infallible rules possible! But, as it is, how often does the teacher, baffled by exceptions to the simplest rules he can frame, give up the effort altogether, and fail even to gain for his pupils the benefit of that 'half loaf' of the proverb.

Because we cannot say of all words similarly spelled that they are pronounced alike, shall we teach the pronunciation of each separately, with no reference to the rest, leaving thus a mere confusion of likenesses and differences? Or shall we clearly separate from the mass that portion—often very large and never despicable—of which we can say to our pupils, ‘Words spelled in this way follow a general rule; knowing that, you need only to learn these, among them, which must be remembered as exceptions.’ In short, shall we anywhere teach fifty separate words where we need teach only a dozen, or a dozen where we need to teach but one? It is forgotten, says Professor Bonamy Price, in a recent article on Education, ‘that memory is far severer for the brain than the exercise of intelligence; and thus the thinking power is struck with paralysis.’

Of another point I wish to speak here: the fact that this direction of thought at once leads the child to consider ‘silent letters,’ so-called, and their real value in words. To return to the example already used: in ‘-a-e’ the *e* ceases to be a superfluity and becomes a component part of the vowel, avoiding a puzzle of lip-reading, which always arises under other methods of teaching. A child sees, we will say, the word ‘Same’ spoken for the first time. We will suppose that sounds are represented to him by unvarying physiological symbols; this word, then, writes itself to his mind thus:  $\sigma\tau\tau\epsilon$  He also knows the written word ‘Same’ and its meaning, but what is there in the picture that this pronunciation makes to suggest it? Or, he has been taught letters and has learned to represent the long *a* sound by the letter which bears that name. Then his mental transcription of the word is this: ‘S-a-m;’ which not only fails to suggest the correct written word, but gives a spelling which actually stands for quite a different pronunciation. If, however, he has been taught this vowel in the way which has been suggested, his ‘-a-e’ at once makes the framework of the written word he knows; the pronunciation and the spelling coincide and become reasonable to his thought. The real importance of this seemingly simple matter would, I think, be quite apparent if time would permit a full discussion here of the part which a secondary letter plays in the actual spelling of words which contain our long vowel sounds. We find the long *a* sound represented in monosyllables by ‘-a-e,’ ‘ai,’ ‘ay,’ etc.: but rarely, if ever, by the letter *a* alone. It is often represented by this letter in polysyllables, but in a great majority of cases is dependent for its value on these same ‘silent letters’ of the root, which must be present to the mind in deciding the pronunciation of the derivative word. A glance at any table of vowel spellings, like that in the key to a dictionary, is enough to open an interesting subject for thought in this direction.

III. Of important letters and spellings having more than one sound, for whose pronunciation no fixed rules can be given, it is taught at once what and how many sounds each has to be remembered and decided between. So, if the pupil cannot be surely told, for example, when *ow* will have one sound and when another, he may at least know that it will have one of two, and that if his first pronunciation is wrong the second must be right. Such spellings are repeated on the chart, each one standing in the groups under every sound it may represent; they are numbered, also, the better to be connected in memory.

IV. The most common spellings of each sound are grouped so that they may stand clearly together before the eye, and be inseparably connected with the thought of that position when seen in speech, to assist the mind in its discriminating process,

V. The attempt has been to represent on such a chart just those rules for pronunciation which the elementary language of classes always obliges them to learn as early as possible; the most nearly invariable and the most frequent in application. And then—

VI. To connect them so intimately with the very sight of letters and act of speech that they shall not need to be remembered, but can be made the base of a continual addition in the shape of short lists of exceptions or of rules that apply only to small classes of words and the words to which they apply, which must be largely matters of memory.”

Although no effort has been made to secure the introduction of these charts into schools for hearing children, they have been used in some cases with the greatest success.

## CONSONANT SOUNDS

h—					
wh	w—				
p	b	m			
t	d	n	l	r—	
k	<sup>1</sup> g	ng			
<sup>c</sup> ck		<sub>n(k)</sub>			
f	v				
<sup>ph</sup>					
<sup>1</sup> th	<sup>2</sup> th				
<sup>1</sup> s	z				
<sup>c(e)</sup>	<sup>2</sup> s				
<sup>c(i)</sup>					
<sup>c(y)</sup>				y—	
sh	zh				
	<sup>3</sup> s				
	<sup>2</sup> z			x=ks	
	z				
ch	j				
<sup>tch</sup>	<sup>2</sup> g—				
	—ge			qu=kwh	
	dge				

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For suggestions as to the order of teaching the elementary sounds see page 34.

VOWEL SOUNDS					
<sup>1</sup> oo	<sup>2</sup> oo	o—e	aw	—o—	
(r)u—e		oa	au		
(r)ew		—o	o(r)		
		<sup>2</sup>			
		ow			
ee	—i—	a—e	—e—	—a—	
—e	—y	ai	<sup>2</sup>		
<sup>1</sup>		ay	ea		
ea					
e—e					
	a(r)	—u—	ur		
		—a	er		
		—ar	ir		
		—er			
		—ir			
		—or			
		—ur			
		—re			
<hr/>					
a—e	i—e	o—e	ou	oi	u—e
ai	igh	oa	<sup>1</sup>	oy	ew
ay	—y	—o	ow		
		<sup>2</sup>			
		ow			

In examining the consonant chart, it will be noted that the left-hand line is occupied by the English breath consonants: the second line by the voiced forms of the same sounds; the third by the nasal sounds. The horizontal arrangement classifies these sounds according to formation. A dash following a letter indicates that the sound is initial in a word or syllable.

In the vowel chart the upper line contains the scale of back round vowels (those modified chiefly by the back of the tongue and the rounded aperture of the lips). The second line contains the scale of front vowels (those modified chiefly by the front of the tongue). The lowest line contains all the diphthongal sounds, for  $\bar{a}$  and  $\bar{o}$ , although previously appearing in the scales to which their radical parts belong, are repeated here as being by their compound nature properly classified with diphthongs.

An attempt is also made in these charts to teach the simple rules of pronunciation. For illustration, *a-e* (representing  $\bar{a}$ ) when contrasted with *-a-* (representing  $\check{a}$ ), is easily made intelligible by the introduction of the same consonants in both sets of blanks; as—*rate*, *rat*, *hate*, *hat*, etc. The dictionary and diacritical marks may be of use later, but not for little children. They will not find diacritical marks over the words in their books or marking the pronunciation of words in their letters from home, but they will, if familiar with the principles of pronunciation represented here, know that final *e* modifies the sound of the vowel preceding it making *a*,  $\bar{a}$ ; *e*,  $\bar{e}$ ; *i*,  $\bar{i}$ ; *o*,  $\bar{o}$ ; *u*,  $\bar{u}$ . They will know that *r final* modifies the vowel which it follows and becomes itself only a glide, etc., etc. In this way words are made to pronounce themselves to the eye of the child. Some time later an hour with the dictionary will make diacritical marks available for the pronunciation of long, hard words and exceptions to rules of spelling, but for hundreds of words the rules indicated by the arrangement of the few dashes on these charts will be sufficient. When a class has built up these charts, sound by sound, as the pupils have gained the ability to give each, comprehending the meaning of each dash and figure, they will find themselves in possession of no small amount of help toward mastering the difficulties of English pronunciation.

The number of secondary spellings given under some of the vowels might be increased, but in order to keep the chart from becoming cumbersome we have omitted all spellings except those covering large classes of words.

FORMATION AND DEVELOPMENT OF ELEMENTARY  
ENGLISH SOUNDS.

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CONSONANTS

*H*—

*Formation:*—*H* is an expulsion of the breath through the open glottis. Ex., *he*, —, —.\*

*Method of Development:*—Imitation. Hold the pupil's hand before the teacher's mouth while she gives *h*. Then induce the child to produce the same. Care should be taken that the chest wall be kept raised.

NOTE I. *H* is the emission of breath through the position for the sound following it as will be seen in the pronunciation of the following words: at, *hat*; eat, *heat*; all, *hall*; it, *hit*; old *hold*.

NOTE II.—In practicing *h* alone let the tongue be left flat and the mouth slightly open. The necessary force of the stream of breath may be shown the pupil by holding a slip of paper, a feather, or a candle flame before the mouth. In cases of nasality the pupil may be made aware of the streams of breath from the nose by breathing against a wall slate, or on a cold mirror.

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\*This indicates that although most sounds may be used in an initial, medial, or final position in a word, the sound of *h* is never used except as initial in word or syllable.

*Wh.*

*Formation:*—Lips rounded. Breath passing out between their approximated inner edges. Tongue raised slightly at the back. Ex., what, —, —.

The true sound of these two letters is in their reverse order, *hw*, and consists of a free emission of breath through the position for *w*,

*Method of Development:*—Imitation. If necessary, attract the pupil's attention to the action of the inner muscles in rounding the lips.

## W—

*Formation:*—Position of the lips the same as for *wh*, this being the vocalized form of that sound. The position of the lips for *w* is almost the same as that for *oo*, but the aperture is closer. The difference between the two sounds may be seen in such words as *woo*, *woof*. Ex., want, —, —.

*Method of Development:*—Contrast with *wh*.

NOTE I.—In regard to *w*, when it occurs before a vowel, Smart says that it “is a consonant, having for its basis the most contracted of the vowel sounds, namely *oo*, which sound, being partially obstructed by an inward action of the lips, and then given off by an outward action, is changed from a vowel to a consonant.”

NOTE II.—All consonant sounds seem to be formed with the sides of the tongue toward the back held against the upper back teeth. In this way only can a center aperture be made and a closure is the closure of such an aperture. Let the teacher prove this to herself by repeating naturally, without movement of the jaw, such syllables as *see*, *see*, *see*; *foo*, *foo*, *foo*; *raw*, *raw*, *raw*. The fact that the diagram most frequently used to represent the position of an elementary sound is a center sectional diagram leads one to ignore the position of the sides of the tongue.

*P.*

*Formation:*—Lips shut, then separated with an audible expulsion of breath. Ex., *pan, open, hop*. In regard to this sound, Prof. A. M. Bell says, “The formation of *P* consists, 1st, in a steady, equal contact of both lips, so as to retain the breath perfectly behind them; and, 2d, in an equal and rapid disjunction of the lips, to allow the breath to escape.” He also says, “Any obstruction of the breath within the mouth, as in forming *p---b, t---d*, etc., should expand the pharynx, so that when the obstruction is removed a degree of percussion should be perceptible from the point of obstruction.”

In the “Introduction” to Soule and Wheeler’s “Manual of English Pronunciation and Spelling” this sound is said to be “formed by a firm contact of the edges of both lips and a compression of the breath within the mouth and pharynx, followed by a sudden separation of the lips, allowing the compressed breath to escape.” Guttman, in his “Gymnastics of the Voice,” says that “*P* is formed by closing the lips tightly, separating the oral from the nasal cavity by means of the palate, and emitting the air compressed within the oral cavity by suddenly opening the lips.”

*Method of Development:*—Imitation. If a narrow strip of paper or a feather be held before the lips as the sound is given, the breath striking it will show the pupil the proper force and direction of the breath as it escapes. Avoid exaggeration in movement.

*B.*

*Formation:*—Lips shut, as for *p*, and held while voice is given.  
Ex., *box, baby, tub.*

Prof. A. M. Bell says that the oral action in *p* and *b* is precisely the same, but in giving *b*, ‘while the organs are in contact, the glottis is brought into sonorous position, and an instantaneous effort of voice is heard before the separation of the organs.’”

Guttmann says, "We may, in fact, say that with *b* the lips are opened by the voice, and with *p*, simply by the air. With *p* the lips must be closed tightly, but not so with *b*." Dr. Arnold in his “Manual” also teaches that in this sound the lips are less closely compressed than for *p*, stating that this is true of all vocal consonants as compared with their corresponding non-vocal forms. Professor Bell says, “*P* and *B*, *T* and *D*, *K* and *G* are pairs of articulations formed by exactly the same organic motions, the only difference being in the material which the actions modify; *whispered* breath in the one case, vocalized breath in the other.”

*Method of Development:*—Contrast with *p*. The pupil, placing his hand on the teacher’s chest, repeats, with her *p, p, p, bŭ, bŭ, bŭ*, feeling the vibrations in the chest; also in the throat, lip and cheek when voice is added. The pure sound of *b* is somewhat difficult to teach, and when so taught is, as a rule, forced and disagreeable in combination. A better result may be obtained by teaching it at first in combination with a vowel. This relieves the pressure and gives a clear sound. Teach *b* initial as *bŭ* and *b* final as *ŭb*, using the “natural vowel” first in combination with it. Then drill upon it—initial and final—with all the other vowels. It may sometimes be advisable to write *final b* as *b<sub>p</sub>*, thus indicating a closing breath vanish.

NOTE.--It is undoubtedly true that every final voiced consonant ends in a breath vanish of the same sound, that is, the vocal bands cease to vibrate an instant before the emission of breath ceases and the mouth position is relinquished.

### *M.*

*Formation:*—Lips shut while voice passes through the nasal passages. Ex., *me, lamp, him.*

Professor Bell says that “the *contact* of the soft palate with the back of the tongue forms the English element *NG*, in which the voice passes entirely through the nostrils,” and that the soft palate is “*approximated* to the tongue for the English articulations *M* and *N*, in forming which the voice escapes by the nose only, but reverberates in the mouth; where it is shut in by the lips for *M*, and by the tongue and front of palate for *N*.” The duration and also the amount of vocality of this sound, as well as of other liquids, vary greatly in different combinations; before and after non-vocal consonants it is short and has but slight vocality; before vocal consonants and vowels it is longer, and when final it sometimes becomes even syllabic in quantity. Compare *lamp, smoke, moon, rhythm.*

*Method of Development:*—Imitation. Attract the pupil’s attention to the closed lips and let him feel the vibration in the lips and if necessary, also in the nose. Great care needs to be exercised lest the pupil give the sound of *ng* with *m*. This defect may often be detected by inducing the child to attempt *ma(r)*. If the back of the tongue is closed the sound of *ng* will be heard between the *m* and a (*r*).

*T.*

*Formation:*—Point of the tongue shut against the upper gum, then removed with an audible expulsion of breath. Ex., *top, city, cart.*

Bell says: “In forming *t* the edge of the whole tongue is laid against the front and side of the mouth, so as perfectly to obstruct the breath.”

*Method of Development:*—I. Imitation. II. By analogy, from *p*. Let the pupil see that the action is the same in giving both sounds, although neither the active nor the passive organ remains the same. If necessary, practice the action with the point of the tongue against the upper lip before applying it in its normal position.

*Formation:*—Point shut as for *t* and held while voice is given. Ex., *dog, garden, old,*

See remarks on shut consonants as quoted under *B*.

*D.*

*Formation:* — Point shut as for *t* and held while voice is given. Ex., *dog, garden, old.*

See remarks on shut consonants as quoted under *B*.

*Method of Development:*—Contrast with *t*. Attract the attention of the pupil to the vibrations in the chest, and also in the throat and tongue when *dŭ, dŭ, dŭ* is given. The same reason favors the teaching of this element in combination with a vowel that has been stated in the case of *b*. Final *d* may be written *d<sub>t</sub>*.

*N.*

*Formation:*—Point of the tongue shut against the upper gum while voice passes through the nasal passages. Ex., *no, any, pin.*

See remarks under formation of *M.*

*Method of Development:*—By analogy from *m.* Let the pupil see that the character of the two sounds is the same, the only difference being the application of the point of the tongue to the upper gum instead of the lower lip to the upper-lip. Let care be taken that *ng* is not given with *n.*

*L.*

*Formation:*—The fore part of the tongue is raised and closed against the upper gum, but an opening over each side allows the escape of an uninterrupted stream of voice. See note on liquids under *M.* Ex., *lark, told, pail.*

*Method of Development:*—I. Teach by quick repetition of syllable *la, la, la.* When the pupil recognizes and imitates the flapping motion of the tongue in giving that syllable, let him hold the initial position as the position for *l.* II. The position of the tongue may be shown against the upper lip, taking care that there be distinct apertures at the “corners of the mouth.” When this position is well taken by the pupil the tongue may be drawn slowly back until it touches the upper gum and voice may be added. Vibration is distinctly to be felt in the cheeks. *L* is often made with the tongue too narrow. From eye-tooth to eye-tooth is a safe rule for the width of application.

NOTE.—*L* may be considered as non-vocal when following a non-vocal consonant. Contrast *l. light, blight, clue, glue, etc.* In such words as *bottle, saddle, etc.,* the *l* final has the function of a vowel.

## R—

*Formation:*—Point of the tongue turned up to the spring of the hard palate and made to vibrate by a stream of breath directed over it. Ex., *run, laurel, —*.

Prof. A. M. Bell says: “When the tip of the tongue is narrowed and presented without contact to the upper gum or front part of the palate, the passage of the breath causes the tongue to quiver or vibrate more or less strongly, and the sound of *r* is produced.” *R* final cannot be classed as a consonant sound.

*Method of Development:*—I. Imitation. Show the pupil the position of the tongue and let him feel the vibration in the tip of the tongue while the sound is being given. II. By analogy from *th*<sup>2</sup>. Let the pupil observe that the character of the vibration in the tip of the tongue is the same in the two sounds, but that the point of application differs.

NOTE.—*R* may be considered as non-vocal when following a non-vocal consonant. Contrast *pray --- bray; try --- dry; crow - - - grow, etc.*

Prof. Bell says that:

*R* after a long vowel is a vowel or a glide.

*R* before a vowel is a consonant.

*R* after a non-vocal consonant is itself non-vocal.

*R* after a vocal consonant is vocal.

*K.*

*Formation:*—Back of the tongue shut against the palate, then separated with an audible expulsion of breath. The precise point of contact varies considerably according to the vowel position with which it is combined. *C* (hard) and *ck* are also spellings for this sound. Ex., *keep, cart, crockery, book.*

*Method of Development:*—I. By analogy from *p* and *t*. Let the teacher attract the pupil's attention to the similar action in these sounds by repeating again and again *p-*, *t-*, *k-*, *p-*, *t-*, *k-*, *p-*, *t-*, *k-*. II. Induce the pupil to attempt *t* while the point and front of the tongue are held down.

### G.

*Formation:*—Back of the tongue shut against the palate and held while voice is given. The point of contact varies for this sound as for *k*. Ex., go, again, dog.

See remarks on shut consonants as quoted under *B*.

*Method of Development:*—Contrast with *k*. Let this sound be taught in combination with a vowel as suggested for *b* and *d*. The vibrations of the voice may be felt in the chest, also in the throat and back of the neck when *gũ*, *gũ*, *gũ* is given. Final *g* may be written *g<sub>k</sub>*.

### Ng.

*Formation:*—Back of the tongue shut against the palate and held while voice passes through the nasal passages. Ex., singer, ring, thank.

See note on liquids under *M*.

*Method of Development:*—I, Form *m* and *n* by analogy. II. With the mouth open pass a steady stream of breath through the nose, then vocalize it. If necessary first pass a stream of breath through the nose with mouth shut.

### F.

*Formation:*—Under lip shut against the edges of the upper front teeth while breath is sent out over the lip and between the teeth with a fricative sound. The lip should be so applied to the teeth as to leave no large openings. Ex., fan, soft, if, telephone.

Prof. A. M. Bell says that “*F* is correctly formed by applying the middle of the lower lip to the edge of the upper front teeth, leaving merely interstitial apertures for the breath between the sides of the lip and the teeth.” In this and all other fricative sounds it is well to attract the attention of the pupil to the tickling sensation produced by the breath upon the lip or tongue. This does much to fix the position and action in the pupil’s mind.

*Method of Development*:—Imitation.

*V*.

*Formation*:—Lip shut against the upper teeth as for *f* and held while voice is given. Ex., voice, seven, save.

*Method of Development*:—Contrast with *f*. Let the teacher repeat *f, v, f, v, f, v*, while the pupil feels the vibration in the throat and lip.

<sup>1</sup>  
*Th*.

*Formation*:—Point of the tongue wide and thin resting lightly against the inner surface or the edge of the upper teeth while breath is sent out between the tongue and teeth. Care should be taken that the tongue does not protrude from between the teeth. Within the mouth the front or top of the tongue is raised slightly—closing at the sides against the teeth and gums. Avoid the raising of the lower lip so high that the resulting sound is a combination of *th* and *f*. Ex., *thin, author, moth*.

“When instead of the tongue being placed in the *z* position its tip is held so low as to touch the edges of the upper incisors or protrude between the teeth, there results a sound which the English call *th*, but which with other nations is called a lisp.” —*Guttmunn*.

*Method of Development:*—I. Imitation. II. By analogy from *f*. Let the pupil see that the same action is required for giving the two sounds; that the passive organ—the upper teeth—remains the same but that the active organ is the point of the tongue in *th* while it is the lower lip for *f*.

Miss A. E. Worcester, in outline lessons to which we are indebted for many suggestions in these notes, said, “The key of all development of one sound from another lies here. Keep steadily before the pupil’s mind and sight the action of the already familiar sound: his attempt being simply to *perform the same actions under different circumstances.*”

<sup>2</sup>  
*Th.*

*Formation:*—Point of the tongue resting against the upper teeth as for *th<sup>l</sup>* and held while voice is given. Ex., *the, father, with.*

*Method of Development:*—I. Contrast with *th<sup>l</sup>*. II. By analogy from *v* as *th<sup>l</sup>* from *f*.

*S.*

*Formation:*—Fore part of the tongue raised so as to leave only a small center aperture between it and the hard palate. Through this aperture the breath passes out striking against the edges of the *nearly* closed teeth. It appears to be of little importance over just what point on the surface of the tongue the center aperture is made—whether at the tip or a little farther back,—if only the angle at which the stream of breath strikes against the edges of the teeth be right. Professor A. M. Bell says,—“The nearly horizontal position of the tongue for this element requires the teeth to be very closely approximated, but without touching.” *C* before *e, i* and *y* (*c* soft) also has this sound. Ex., *sit, basket, yes, cent, cider cypress.*

*Method of Development:*—I. Imitation. Show the pupil the center aperture over the tongue and attract his attention to the central stream of breath to be plainly felt through the nearly closed teeth. Use a strip of paper or a feather to show direction and force of breath. II. Nearly close the teeth while giving whispered *e*. III. Manipulation from *th*<sup>1</sup>. As the general position, of the tongue is nearly identical with that of *th*, while the tongue endeavors to retain the position and continue the sound of *th*<sup>1</sup> let the point be pushed gently back.

### Z.

*Formation:*—Center aperture over the fore part of the tongue as for *s*; teeth in same position; breath *vocalized*. This sound is also represented by *s*. Professor Porter, in the preface to the International Dictionary, said of this sound that “When final in a syllable and not followed immediately by a vowel or other sonant element, it takes a vanish of a surd *s* sound,” Ex., zone, frozen, buzz, his.

*Method of Development:*—I. Contrast with *s*<sup>1</sup>. Let the pupil feel the vibration in the teeth, chin, and throat. II. Nearly close the teeth while giving *e*. III. Manipulation from *th*<sup>2</sup> as *s* from *th*<sup>1</sup>.

### Sh.

*Formation:*—Fore part of the tongue raised so as to form a center aperture slightly larger and farther back than for *s*. Through this aperture the breath passes out striking against the edges of the nearly closed teeth. Ex., *she*, bushel, fish.

*Method of Development:*—I. Imitation. Show the pupil the position of the teeth and attract his attention to the wide stream of breath. A diagram of the position of the tongue in the mouth may be of assistance. II. Contrast with *s* attracting the pupil's attention to the altered position of the tongue and to the wider stream of breath. III. *Sh* may frequently be obtained from voiceless *r* by simply closing the teeth while the pupil attempts to retain the tongue position for *r*.

### *Zh.*

*Formation:*—Tongue and teeth in the same position as for *sh*, but voice is given instead of breath. This sound is represented in our language by *s* or *z*. It does not occur alone as initial. Ex., —, measure, azure.

*Zh*, when initial or final, is always combined with the sound of *d*, and this sound (*dzh*) is represented by *j*, *dg*, or *g*, as in *judges*, *cage*, etc.

*Method, of Development:*—Contrast with *sh*. Let the pupil feel the vibration in the jaw, chin, back of the neck and throat.

### *Ch.*

*Formation:*—The front of the tongue in position for *sh* is closed and then a *center aperture* is forced open by the breath. Second part of *ch* is continuous not explosive.

Bell gives this sound as a combination of *t* and *sh*. Various other authors give the formation as stated above. Ex., *chair*, *preacher*, *larch*.

*Method of Development:*—Imitation. Let the pupil notice the position of the tongue and feel the escape of breath.

*J.*

*Formation:*—Position and action of the tongue the same as for *ch* of which *j* is the vocalized form. This sound is also represented by the letter *g* called “*g soft*.” Ex., *jump, gem, legion, age, judge*.

*Method of Development:*—Contrast with *ch*.

NOTE.—It may be well to teach *initial j* as *jŭ*, and final *j* as *ŭj*. Final *j* may be written as *j<sub>ch</sub>*, thus indicating a final breath vanish.

*Y—.*

*Formation:*—Top or front of the tongue raised and shut at the sides leaving only a small center aperture through which voice passes out. The tongue in forming this sound is almost in position for the vowel *ē*, but the aperture over the center is closer. The difference between the two sounds may be seen in such words as *ye* and *year*, in which the vowel *ē* follows the consonant *e* or *y*. Ex., *you, —, —*.

*Method of Development:*—I. By manipulation from *z*. Often simply separating the teeth is all that is necessary. II. By forcible retraction of the tongue from the position assumed for vocal *th*, while the pupil’s hand is placed under the teacher’s chin. III. If developed after *ē* it may be taught by contrast as a closer form of that sound.

*X.*

*X* is the equivalent of *ks*. Ex., *box*. In combining the two elements *k* and *s*, it is often well that the teeth be placed in position for *s* before the *k* is given. The pupil may be made aware of the expulsion of the breath by holding his hand before the teacher’s mouth.



## OO SHORT

*Formation:*—The tongue and lips are in nearly the same position<sup>1</sup> as for *oo*, but the aperture is slightly more open.

*Quantity:*—Short.

*Chart Spelling:* <sup>2</sup> *oo*.

*Example:*—*book*.

*Method of Development:*—Shorten <sup>1</sup> *oo*.

## O LONG

*Formation:*—The first or radical part of this sound is produced by a position slightly wider than for *oo short*. The second part, which is a glide or vanish, is *oo long*.

*Quantity:*—This vowel is diphthongal, the first part being long and the second short.

*Chart Spellings:* —*o-e*, *oa*, —*o*, <sup>2</sup> *ow*.

*Examples:*—*stone*, *boat*, *potato*, *snow*.

*Method of Development:*—By contrast with <sup>1</sup> *ow* (*ow* as in *cow*).

## AW.

*Formation:*—The back of the tongue a little lower than for the radical part of the preceding vowel; the lip aperture being greater; with its vertical diameter longest.

*Quantity:*—Long.

*Chart Spellings:* *aw*, *au*, *o(r)*.

*Examples:*—*saw*, *haul*, *for*.

*Method of Development:*—I. Contrast with *a (r)*. II. From the radical part of *ō* by widening the aperture slightly.

## O SHORT

*Formation:*—The tongue slightly lower than for the preceding sound. Lip aperture less rounded. This is the lowest back vowel position.

*Quantity:* Short,

*Chart Spelling:* -o-

*Example:* —not.

*Method of Development:*—Shorten the preceding sound.

## FRONT VOWELS.

## E LONG.

*Formation:*—Voice moulded by passage through the closest possible vowel aperture over the front of the tongue.

*Quantity:* Long.

*Chart Spellings:* ee, —e, <sup>1</sup>ea, e—e.

*Examples:* see, we, meat, these.

Professor Bell says that in the formation of this sound “the tongue rises convexly within the arch of the palate, and presses laterally against the palate and back teeth, leaving only a very narrow aperture for the voice, between the middle of the tongue and the palate.”

*Method of Development:*—I. Imitation. Vibration may be felt in the larynx; on the chin; under the chin; also on the top of the head. II. By contrast with *a(r)*. III. From the vocal. Draw the point of the tongue forcibly back from the position for *th*, its sides being held against the upper side teeth. The action in this case will be most distinctly felt under the chin. IV. From *s* or *z* in the same way as from *th* vocal. V. By manipulation from *th* vocal or *z*.

## I SHORT

*Formation:*—Aperture over the front of the tongue slightly wider than for *e* long.

*Quantity:* —Short.

*Chart Spellings:* —i—, —y.

*Examples:*—pin, candy.

*Method of Development:*—By contrast with  $\bar{e}$ , attention being directed chiefly to difference in quantity, but also to the difference in position. It is better to *widen a vowel aperture by lowering the tongue*, not by dropping the jaw. The relative length of sounds may be taught by attracting the pupil's attention to the period of vibration of each. This may be represented by lines on the wall slate or by directive gestures. In contrasting  $\bar{e}$  and  $\check{i}$  it is sometimes well to make the pupil aware of the expansion of the pharynx by placing the hand on the teacher's throat when  $\check{i}$  is given.

## A LONG.

*Formation:*—The first or radical part of this sound results from a position of the front of the tongue a little lower than that for  $\check{i}$ . The second part of this sound, which is a glide or vanish, is the vowel  $\bar{e}$ .

*Quantity:*—This sound is diphthongal, the long radical part being placed first and the short glide last.

*Chart Spellings:*—a-e, ai, ay.

*Examples:*—cake, bail, say.

*Method of Development:*—I. By contrast with  $\bar{i}$ . II. The attempt to combine  $\check{a}$  and  $\bar{e}$ , will often produce the desired sound, but care must be taken to teach the relative length of the two elements.

*E* SHORT.

*Formation:*—General position the same as that for the radical part of  $\bar{a}$  but with a slightly wider aperture.

*Quantity:*—Short.

*Chart Spellings:*— -e-, ea.<sup>2</sup>

*Examples:*—red, bread.

*Method of Development:*—I. By shortening the radical part of  $\bar{a}$ . II. By contrast with  $\check{a}$ . III. By running down the scale from  $\bar{e}$  until this position is reached.

*A* SHORT.

*Formation:*—General position the same as that for  $\check{e}$ , but with slightly wider aperture. This is the lowest position in the front vowel scale.

Professor Bell says that “the enlargement of the formative aperture is caused by the depression of the *middle of the tongue backwards.*”

*Quantity:*—Short.

*Chart Spelling:* —a—

*Example:*—cat.

*Method of Development:*—I. By contrast with  $a(r)$ . II, By running down the scale from  $\bar{e}$  until this position is reached. III. By widening the position for  $\check{u}$ .

## UNROUNDED BACK VOWELS AND MIXED VOWELS A(R)

*Formation:*—Tongue position for this sound (a before r) is the same as for *o short*, but without modification by the lips. It is sometimes a wider form of *u short*. In the speech of some localities this sound ends with a *glide r*. This sound is often designated as *Italian ä* or *ah*.

*Quantity:*—Long.

*Chart Spelling:* a(r).

*Example:*—arm.

*Method of Development:*—Imitation.

NOTE.—As this vowel is, frequently, the one first taught, too great care can hardly be given to the quality of the voice secured and the unstrained, natural use of the vocal organs. Seldom should any other vowel be attempted until this one is given in a satisfactory manner.

## U SHORT.

*Formation:*—The back of the tongue is a little higher than for a (r).

*Quantity:*—Short.

*Chart Spelling:* -u-, —a, —ar, —er, —ir, —or, —ur, —re.

*Examples:* cup, China, collar, flower, their, color, flour, there.

*Method of Development:*—Shorten the preceding sound and, if need be, raise the back of the tongue slightly.

## UR.

*Formation:*—The whole tongue should be low and flat in the mouth. The teeth should be but slightly parted.

*Quantity:*—Long.

*Chart Spelling.*- ur, er, ir.

*Examples:*—*fur, her, sir.*

*Method of Development:*—From *a(r)*. Retain the same tongue position but nearly close the teeth. If desired add *glide r*.

NOTE.—In American speech the sound of *ur* is often made by raising the back of the tongue.

## DIPHTHONGS.

## I LONG.

*Formation:*—The first or radical part of this vowel is Italian *ā* or *ah*, the second part is a glide or vanish to long *e*.

*Quantity:*—This vowel is diphthongal, the first part being long and the second short.

*Chart Spellings:* i-e, igh, -y.

*Examples:*—*side, night, by.*

*Method of Development:*—I. Combination of the two parts. II. By contrast with *ā*.

## OU.

*Formation:*—The first or radical part of this vowel is the same as in the preceding sound, the second part is a glide to <sup>2</sup>oo.

*Quantity:*—The first part of this diphthong is long, the second is short.

*Chart Spellings:* ou, ow.<sup>2</sup>

*Examples:*--proud, cow.

*Method of Development:*—I. Combination of the two elements. II. By contrast with ō.

## OI.

*Formation:*—The radical part of this vowel is *aw*, the glide is short *i*.

*Quantity:*—The long radical part is followed by the short glide.

*Chart Spellings:* oi, oy.

*Examples:*—oil, boy.

*Method of Development:*—Combination of the two elements.

## U LONG.

*Formation:*—This sound is composed of <sup>1</sup>*ē* and oo.

*Quantity:*—The first element in this diphthongal sound is short, the second is long.

*Chart Spellings:* u-e, ew.

*Examples:*—use, few.

*Method of Development:*—I. Combination of the two elements, taking care that their relative lengths be regarded. II. First take position for ē or ŭ, draw the tongue back forcibly and round the lips.

*A long* and *o long* are also diphthongs, but are omitted here each having been included in the scale of which its radical part forms one step.

We have omitted from this list of sounds selected for description, some sounds found in the speech of most educated people, but we believe we have omitted none that is essential to an intelligible pronunciation of our mother tongue.

#### AN ORDER OF TEACHING ELEMENTARY SOUNDS.

The order which it is advisable to follow in teaching the elementary sounds is simply one of expediency. It would, no doubt, be possible to teach them in the order of their natural arrangement in groups and scales, but it is vastly easier for a little deaf child if he is aided in accomplishing the work of acquiring these sounds by a judicious order in teaching, so that he may not be confused by attempting to learn at the same time elements too closely resembling each other in formation. We would suggest the following order as one which presents, possibly, as few difficulties as any other.

Teach Group I first. When that is completed, teach the sounds contained in II and III at the same time, taking sounds alternately from each.

*Group I.*

wh  
 p  
 f  
 th<sup>1</sup>  
 th<sup>1</sup>  
 oo  
 t  
 ar  
 k  
 ou  
 s

*Group II.*

v  
 th<sup>2</sup>  
 m  
 n  
 b  
 d  
 g  
 h-  
 y-  
 w-  
 z  
 l  
 r  
 ng  
 qu  
 x  
 ch  
 j-  
 zh

*Group III.*

aw  
 ee  
 o-e  
 oo<sup>2</sup>  
 -u-  
 \* -i-  
 -o-  
 i-e  
 oi  
 -a-  
 u-e  
 ur  
 -e-  
 a-e

\*Taught as a group, by shortening the form of the long vowels.

## GENERAL NOTES ON ELEMENTARY SOUNDS.

Speech is said to consist of a series of significant sounds produced by emissions of breath, variously modified. These elementary sounds and the letters which represent them are divided into two general classes: vowels and consonants.

An edition of Walker's Dictionary bearing date of 1828 distinguishes between these two classes of sounds in the following words: "A vowel is a letter which can be sounded by the human voice without the aid of any other letter. A consonant," it says, "is a letter which cannot be sounded without the aid of some other." In marked contrast to this we find the following distinction made in the introduction of Soule and Wheeler's "Manual of English Pronunciation and Spelling": "A vowel sound is a sound produced by an unobstructed utterance of the breath (as in whispering), or of the voice (as in speaking aloud), more or less modified by the position of the tongue, the soft palate, and the lips, or by the motions of the lower jaw in varying the cavity of the mouth. The letter which represents such a sound is called a *vowel*; but this term is sometimes applied to the sound itself." "A consonant sound is a sound produced by the partial or the total obstruction of the breath or the voice, on passing through the mouth or the nose, by the contact or the approximation of two of the organs of speech, as the two lips (*b, wh, m*), the lower lip and the upper teeth (*f, v*), the tip of the tongue and the upper teeth (*th* as in *thin*, *th* as in *this*), the tip of the tongue and the hard palate (*sh, zh*), the back of the tongue and the soft palate (*g, ng*): or it is a sound produced by an utterance of the breath at the moment of separating two of these organs (*k, p, t*). The letter which represents such a sound, and sometimes the sound itself, is called a *consonant* (from the Latin *consonants*, meaning literally *sounding with*), a name probably suggested by the fact that a vowel sound is usually joined with a consonant sound in forming syllables, though not meant to imply, as some writers seem to have supposed, that no consonant sound can be uttered without being joined with a vowel sound."

Professor Alexander Melville Bell says: "Vowels are *throat sounds* which simply pass through the varying mouth-channels; consonants are sounds formed *in the mouth*, as the result of friction, compression, or interception of the breath." In another case he says: "The channel of the mouth, and also the formative aperture for every vowel must be free from interruption or constriction; otherwise the vowel is changed into a consonant. This is the characteristic difference between vowels and consonants. All consonants have an obstruction or compression of some part of the mouth-channel, producing an effect of friction, sibilation, buzzing, or intermittence of sound. Many of the

vowels, therefore, give rise to consonants when their aperture is slightly compressed. . . . Vowel sounds are all syllabic.” Elsewhere he says: “The vowels are the material of speech, and the articulations<sup>1</sup> are the joints or hinges by whose motion the vowels are separated from each other and are affected in their duration.”

The number of vowel and consonant sounds in our language as given by various authorities varies greatly. The five vowel letters are asserted by Walker (1828) to have seventeen sounds; while the Century Dictionary gives twenty-one vowels and diphthongs, and Professor Whitney states that this last number is greatly increased, “even in the mouths of the best speakers,” by abbreviation and lightening.

<sup>1</sup>The word “articulation” is here limited to consonants.

Some authorities divide vowels into pure and impure, or simple and compound. Other authorities avoid such classification, but speak of the long diphthongal sounds of *ā*, *ī*, *ō*, and *ū*.

Professor Alexander Melville Bell’s system of Visible Speech classifies vowels, according to the formation, as *front* or *back* vowels (front or back of the tongue being the chief modifying organ); also as *high* or *low* vowels (referring to the position of the tongue in the mouth). All diphthongal sounds are classified as diphthongs *ā*, *ī*, *ow*, etc.

Consonants are divided into spirants, sibilants, nasals, labials, dentals, gutturals, etc.

“Resonance in an unobstructed oral passage is the characteristic feature of the vowels; and the peculiar resonance in the case of each vowel is what mainly distinguishes it individually from the others. Obstructive action is the leading feature of the consonants; and the kind and manner of the obstruction is what mainly distinguishes one consonant from another.

“Obstruction is, indeed, not absent from the vowel. The vocal cords are set in vibration only as they obstruct the outgoing stream of breath. But this action does not differentiate the vowel qualities. There is, too, for the vowels, what may in one sense be called an obstruction in the oral passage; but only, or mainly, as involved in the formation of a vowel chamber, and thus as re-enforcing instead of obstructing the sound, and as subservient to the resonance that imparts the vowel quality. So far as it acts otherwise it gives to the vowel more or less of a consonantal character.

“Resonance, on the other hand, is not absent from the consonants. The nasals, n, m, ng, are marked as such by their peculiar resonance, and each has a different resonance to distinguish it from the others. The same is true of the sonant mutes, b, d, g. But all these are ruled out from the vowel category by the absolute closure of the oral passage. Except in the nasals and the sonant mutes, whatever resonance there may be has no share in forming the characteristic quality of the consonant.”—Preface to International Dictionary, 1890.

“The accepted theory of vowel formation is that the vowels are produced by adjustments of the oral cavity in such ways as to reinforce for the vowels respectively certain of the ‘overtones’ or ‘upper partials’ or harmonic notes that are contained in the tone produced in the larynx. As regards the palatal vowels, the ‘front vowels’ of Professor Bell, I at one time supposed, as others, I believe, have done, that the part of the oral cavity especially concerned was that between the front of the tongue and the soft palate. I have been led, however, to the conclusion that the part between the back of the tongue and the palate and the back wall of the pharynx is equally efficient, and its action equally essential.

“These vowels are divided into what Professor Bell calls *high*, *mid* and *low*,—of which the vowels in *eat*, *ate*, *at*, may be taken respectively as examples,—according as the front of the tongue is more or less depressed. It is remarked by Henry Sweet (‘Hand-book of Phonetics,’ p. 211), referring to Bell’s diagrams, that not only is the tongue lowered [in the front], but the point of greatest narrowness is shifted back, the size of the resonance-chamber being thus increased in both directions.’ He adds that the passage to this chamber may be as narrow for so-called ‘low’ as for one that is ‘mid’ or ‘high’; this passage being the place of greatest constriction between tongue and palate.

“The vowels as high, mid, and low, are subdivided, by Prof. Bell and Mr. Sweet, into the ‘narrow’ and the ‘wide.’ This difference, according to Mr. Sweet, depends on the shape of the upper surface of the tongue, as pressed upward convexly, or as relaxed and flattened. The effect would obviously be, while altering the shape of the passage, to make it narrower or wider. In fact, the whole of the tongue is lowered as the passage is widened. Examples are: *feet*, narrow; *fit*, wide; *fate*, without the *vanish*, narrow; *pet*, wide; *have*, narrow; *hat*, wide. My own view is that there should be marked more than two degrees of the narrow and the wide.

“But what I now aim to show is that, whether high, mid, or low; and of each of these, whether narrow or wide, there is a resonance-cavity behind, as well as before, the place of greatest narrowness, and corresponding in size with the one before ; that is to say, smaller for the high, larger for the mid, and still larger for the low; and, as I conjecture, tuned each to the same pitch with the one corresponding in front, so as to respond to the same harmonic note in the tone from the larynx. One effect, of course, is to shorten at each end the narrow passage, or part of the greatest constriction for the mid, and still more for the low,”—*Professor Samuel Porter, Report of Convention, 1884.*

“It may be affirmed:

“I. That the consonants modify the vowels with which they are associated in position, tone, inception and termination.

“II. That the positions of the organs in articulating the consonant sounds are influenced by those of the vowels which precede or follow.

“III. And it is also manifest that the organs of speech are always endeavoring to minimize muscular effort in combining sounds for the sake of ease, or as in mechanics, to economize force and avoid undue friction,

“IV. But the action of the organs of speech is facile or difficult, simple or complex, according to their relative positions and the muscular energy required in shifting them.”—*Arnold's Manual, Vol. 1.*

“If the breath pour out continuously, and the chest fall, the lungs will soon be exhausted . . . . the breath in articulation is exploded from the *mouth*, and not from the chest. The space within which the air is compressed is *above* the glottis and the effect of the compression must not be communicated below the glottis.”—*Bell's Principles of Speech and Dictionary of Sounds, p. 162.*

“Among the Articulations there are various degrees of quantity. The vocal articulations are essentially longer than the non-vocal but in each class there are varieties. Thus: The Breath Obstructives, P, T, K, are the shortest.

“The Breath Continuous Elements, F, Th, S, Sh, are the next longer.

“The Shut Voice Articulations, B, D, G, are the next in length.

“The Close Continuous Voice Articulations, VF Th, Z, Zh, are longer still.

“The Open Continuous Voice Articulations (or Liquids) L, M, N, Ng, are the longest simple articulations.

“Wh, W, Y, R, are not included, because these articulations do not occur after vowels, but only as initials in English; and all initial letters, whether voice or breath, are alike in quantity.”—*Bell's Principles of Speech and Dictionary of Sounds*.

“According to Dr. Ernest Brucke, of Vienna, the three vowel sounds of *E* (as in *he*), *A* (as in *ah*), and *O* (as in *cool*) are the fundamental sounds upon which the system of vowels rests; the other vowels being only intermediate sounds resulting from these three. Of these three vowels, *A* is produced without any change in resonator (i. e., the pharynx, and the oral and nasal cavities); *O* by lengthening it and narrowing its exterior end, and *E* by shortening it and narrowing it. Or, with respect to the length of the resonator, we may say it is greater with *O*, and least with *E*, and intermediate with *A*.

“Let us begin with *A*. Separate the jaws so far as to admit the thumb between the teeth; keep the lips perfectly still, without pressing them against the teeth or thrusting them out, but in such a way as to leave the extremities of the front teeth slightly visible; then perform a sounding expiration. The tongue should be perfectly flat and inactive at the bottom of the oral cavity; or better still it may be made to assume a longitudinally concave position. *A* is the only vowel in the production of which the hyoid bone preserves the same position as when the organs are inactive; the larynx, however, is carried upward, somewhat, so that the sounding air column, issuing from it, shall strike more forcibly against the roots of the upper incisors than against any other part.

“The transition from *A* to *E* is effected by the elevation of the larynx and the hyoid bone, without the relative positions being altered; from *A* to *O* by the larynx being drawn downward as far as possible away from the hyoid bone, which is carried forward somewhat. The production of *E* (as in *he*) requires the greatest narrowing of the oral passage, and the greatest shortening of the resonator. The *first* is effected in this way: The middle portion of the tongue is brought on both sides in contact with the palate, while its tip is made to press against the lower incisors (without, however, projecting beyond them), and its body being placed so as to present a longitudinal cavity through which the air passes. The *second* is effected by carrying the larynx upward as far as possible, upward as far as possible, while the resonator at the opposite end is shortened by drawing the corners of the mouth back in the direction of the ears. In the production of *O* (as in *cool*), the larynx occupies the most depressed position. The resonator is consequently the longest and is narrowed at its exterior end. The lips are thrust forward in such a way as to leave only a small, nearly circular opening between them. The tip of the tongue, which with *E* was placed against the lower incisors, is drawn

back a little from the teeth and held on a level with the edges of the lower incisors, while the back of the tongue is slightly arched.:—*Guttmann's Gymnastics of the Voice*.

The following is a list of the English vowels numbered from 1 to 13. Those which when accented are always long are marked (—): those which are always short (˘): and those which are sometimes long and sometimes short (—˘):

### NUMERICAL NOTATION OF ENGLISH VOWELS

1. (—)	eel	pull, pool,	(—˘)	13
2. (˘)	ill	old,	(—)	12
3. (—)	ale	ore,	(—)	11
4. (˘—)	e, ere	on, all,	(˘—)	10
5. (˘)	an	up, urn	(˘—)	9
6. (—)	ask	earn,	(—)	8
		7 (—)	ah	

— *Bell's Principles of Speech and Dictionary of Sounds*.

“The cavities which modify vowels consist not only of the visible cavity in front of the vowel aperture, but also of one simultaneously formed behind the tongue; and these two resonance chambers are of different pitch.

*Bell's Visible Speech and Vocal Physiology*

“A vowel is a syllabic sound moulded by a definite and momentarily fixed, or tense configuration of the free channel of the mouth, and creating no oral sybilation or friction in its emission. A vowel without a fixed configuration loses its syllabic effect and becomes a glide, and a glide with sybilation or friction in the oral channel becomes a consonant. Consonants, like glides, are merely transitional sounds, but their configurations may be held, so as to receive syllabic impulse, in which case a consonant without a vowel has the effect of a syllable.

“All vowels make syllables. Primary vowels are those which are most allied to consonants, the voice-channel being expanded only so far as to remove all fricative quality. The same organic adjustments form ‘wide’ vowels when the resonant cavity is enlarged behind the configurative aperture;—the physical cause of ‘wide’ quality being retraction of the palate, and expansion of the pharynx.”

—Inaugural Edition of Visible Speech.

## VOWEL AND CONSONANT CHARTS

as originally devised by Miss Worcester bearing date of 1885.

## VOWEL CHART.

$\left\{ \begin{array}{l} ee \\ -e \\ -e-e \\ ea^1 \end{array} \right.$	$\left\{ \begin{array}{l} er \\ ir \\ yr \\ ur \\ \text{---}ar \\ \text{---}or \\ \text{---}re \end{array} \right.$	$\left\{ \begin{array}{l} oo^1 \\ u^3 \\ -w \end{array} \right.$
$\left\{ \begin{array}{l} -i- \\ -y- \\ y- \end{array} \right.$	$\left\{ \begin{array}{l} \text{---}ar \\ \text{---}or \\ \text{---}re \end{array} \right.$	$\left\{ \begin{array}{l} oo^2 \\ w- \\ u^4 \end{array} \right.$
$\left\{ \begin{array}{l} -a-e \\ ai \\ ay \end{array} \right.$	$ar$	$\left\{ \begin{array}{l} -o-e \\ oa \\ \text{---}o \\ ow^2 \end{array} \right.$
$\left\{ \begin{array}{l} -e- \\ \text{---}y \\ ea^2 \end{array} \right.$	$\left\{ \begin{array}{l} -u^2- \\ \text{---}a \end{array} \right.$	$\left\{ \begin{array}{l} or \\ au \\ aw \end{array} \right.$
$-a-$		$-o-$

. . . . .

$\left\{ \begin{array}{l} you \\ u^1 \end{array} \right.$	$\left\{ \begin{array}{l} -i-e \\ -y-e \\ igh \\ -y \end{array} \right.$	$\left\{ \begin{array}{l} ou \\ ow^1 \end{array} \right.$	$\left\{ \begin{array}{l} oi \\ oy \end{array} \right.$
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*Key to Vowel Chart.*

{ see		{ boot	
{ me		{ rude	
{ these		{ screw	
{ meat	{ her	{ book	
	{ sir	{ want	
	{ martyr	{ put	
{ sit	{ fur		
{ hymn	{ dollar	{ home	
{ yard	{ doctor	{ coat	
	{ fire	{ potato	
{ came		{ throw	
{ tail	cart		
{ day		{ corn	
		{ because	
{ ten	{ cup	{ saw	
{ sorry	{ sofa		
{ head		not	
cat			
. . . . .			
{ youth	{ mine	{ out	{ oil
{ use	{ scythe	{ cow	{ boy
	{ right		
	{ my		

## CONSONANT CHART.

p	{ f	sh
t	{ ph	
{ k	v	r—
{ ck	th	l
{ c	th <sup>2</sup>	wh
{ b—	{ s	{ ch
{ —b	{ c (ce)	{ tch
{ (bp)	{ c (ci)	{ j
{ d—	{ c (cy)	{ g
{ —d		{ —ge
{ (dt)		{ (dch)
{ g—	{ z	h
{ —g	{ z <sup>e</sup>	x
{ (gk)		qu
m		
n		
ng		

## Note from Internet Publisher: Donald L. Potter

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Caroline Yale's work is **fundamental**, being of **universal application** in the teaching of reading with phonics. Note her prophetic statement, "Although no effort has been made to secure the introduction of these charts into schools for hearing children, they have been used in some cases with the greatest success."

The highly successful 1942 *Phonvisual Method* ([www.phonovisual.com](http://www.phonovisual.com)) was an adaptation of Yale's *Northampton Charts. The Association Method* by Mildred A. McGinnis (*Aphasic Children*, 1963), and later N. Etoile DuBard and Maureen K. Martin (*Teaching Language-Deficient Children: Theory and Application of the Association Method for Multisensory Teaching*, 1994), used Yale's Charts as the basis of their method. The original *Open Court Reading Program* developed by Priscilla McQueen (See note below.) followed McGinnis' *Association Method*. It is sad to note that the new *Open Court* method (SRA-McGraw-Hill edition) has departed considerably from its original basis in *The Association Method*. The original *Open Court* methodology (following *The Association Method*) is superbly maintained in William C. Carroll and Kenneth A. Lexier's *School Phonics*, which has unfortunately been discontinued by Didax. Other examples of work making use of the Yale's Charts and the Association method are the Orton-Gillingham work of the 1960s and *Slingerland's Multisensory Approach to Language Arts for Specific Language Disability Children* (1971).

I am republishing Yale's work for free internet distribution with the hope of introducing this historically invaluable work on elementary English phonics to those interested in the history of phonics instruction in America. It is of **perennial value** to all interested in developing practical methods for effective phonics instruction.

Sincere thanks to the *Clarke School for the Deaf* for permission to republish Caroline Yale's 1946 pamphlet *Formation and Development of Elementary Speech* on my web site: [www.clarkeschool.org](http://www.clarkeschool.org).

See my web site, [www.donpotter.net](http://www.donpotter.net), for more information on phonics-first.

Note on Priscilla McQueen and *Open Court*, 1963: "*The McQueen Integrated Phonics Method* for beginning reading was developed by Priscilla Luetscher McQueen over a period of 18 years from 1943 to 1962 while she was a teacher in the Central Institute for the Deaf and Direction of a remedial reading clinic in Tiskilwa, Illinois. Mrs. McQueen was especially interested in the development of speech for the hard of hearing child, and for the aphasic child. Her interest in the field and her knowledge of the work of Professor Mildred McGinnis at the Washington University Institute for the Deaf in St. Louis were the basis for her program. (Robert Auckerman's *Approaches to Beginning Reading*, 2nd ed. 1984, p. 572.)

“Yale, Caroline.” *Encyclopedia Britannica*. 2006. Encyclopedia Britannica Premium Service. 29 July 2006

**Caroline Yale** was born on September 29, 1848, Charlotte, Vermont, U.S. and died July 2, 1933, Northampton, Massachusetts

Yale attended Mount Holyoke Female Seminary (later Mount Holyoke College; 1866–68). She taught briefly in schools in Brandon and Williston, Vermont, and in 1870 joined the staff of the Clarke Institution for Deaf Mutes (from 1896 the Clarke School for the Deaf) in Northampton, Massachusetts. In 1873 she became associate principal, and in 1886 she succeeded the ailing Harriet B. Rogers as principal.

At the Clarke School, Yale and a fellow teacher developed a more detailed and accurate system of phonetic symbols to replace those in Alexander Melville Bell’s Visible Speech (1867). The resulting “Northampton Vowel and Consonant Charts,” explained in the pamphlet *Formation and Development of Elementary English Sounds* (1892), became the most widely used system in America. In 1889 Yale also established a teacher-training department at Clarke and introduced pioneering classes in manual skills and programs of athletics for deaf children. In 1890 she helped establish the *American Association to Promote the Teaching of Speech to the Deaf*, and she served as its director for many years. She retired as principal of the Clarke School in 1922 but continued to direct the teacher-training program until her death. In 1931 she published an autobiography, *Years of Building: Memories of a Pioneer in a Special Field of Education*.

Mr. Donald L. Potter updated this document on July 2, 2018 and August 28, 2019.