SPEECH AND ALPHABETICS.[1]

I HAVE never practised offhand utterance on any subject. I have always had to write what I had to say; so that I have enslaved myself to a method which I cannot now hope to change. The method, however, has this advantage; namely, that it keeps one to the point, prevents rambling of thought and vagueness of expression, and so enables one to be exact to his intention, both in outline and detail. I do not mean that an address on such an occasion as the present should be read, but that, however little used, the presence of paper secures presence of mind. On the whole, therefore, I do not know that I should greatly care to change my method, even if I could.

We are called on to say something on the subject that most interests our thoughts. This requirement will, of course, furnish excuse for whatever of egotism there may seem to be in our response to the call. For my part, I can say, that, while I have from time to time ridden an occasional hobby, there has always been one subject of abiding interest which has persisted in maintaining prominence in my thoughts from my earliest days until now. That subject has been "Speech and Alphabetics."

I had hereditary leanings to the profession of teacher of vocal physiology, which no doubt influenced the current even of my boyish thoughts; and when, in 1841, I began to prepare myself for independent work, I sought to supplement what I may call the family knowledge which I possessed, by the study of all available books on the subject. I found, however, that but little assistance was to be obtained from this source; for the art of treating defects of speech had been shrouded in secrecy by nearly all its practitioners. My father was, in fact, the first to repudiate occult methods in the cure of stammering, and to practise his system openly. At the time I speak of, there did not exist in print, so far as I could discover, any precise directory for the processes of articulation. I aimed at teaching these processes, but could not find a single work that gave specific guidance as to what to do, or how to do it, in any given case. Under these circumstances, I had to investigate from my own organs and the organs of my pupils. I had many pupils, exhibiting wide varieties of defects and peculiarities, and the observations on these by day became the study of the night. I may add, however, that my night-work never interfered with day-work; that it invariably terminated not later than two in the morning, while the day-work invariably began not later than ten. This was very nearly the philosopher's division of the twenty-four hours, — one third for work, one third for recreation, and one third for rest. But my work and recreation were inseparable. Work was one half recreation, and recreation one half work, on the principle that "the labor we delight in physics pain," or, in other words, is recreative.

Years of this pleasurable devotion to one subject ultimately developed what I had sought in vain to find as a legacy from professional predecessors. In 1849 the first results of my labors were published under the title of "A New Elucidation of the Principles of Speech and Elocution," forming the kind of directory which I had desiderated before I began to teach. But this work was far from exhausting my phonetic material, which was still, moreover, increasing. I had become experimentally acquainted with a category of sounds far exceeding those in any language. The peculiar elements in Gaelic, Welsh, Scotch and Irish dialects, provincial and metropolitan English, American English, French, German, etc., — as well as those accidental sounds produced by stammerers, lispers, persons with cleft palate, deaf-mutes, etc., — were familiar to my ear and my vocal organs; and I sought long to incorporate them into one phonetic scheme, where each sound should find its place in due relation to every other sound. The process was the converse of that which had been tried for the collation of a universal alphabet. Eminent linguists had endeavored to collect from all known languages the sounds of each, and from these to frame an alphabet by which all tongues might be uniformly written. But no success had attended the efforts, because the identities and differences among the elements could not be satisfactorily determined. At a conference held in 1854, the object thus aimed at was finally abandoned, and declared to be impossible.

[1] Address by Professor A. Melville Bell, delivered in Washington, D.C., Jan. 28, 1889.

A different basis, however, seemed to me to promise a different result. My aim was to find a physiological instead of a linguistic basis for the desired universal alphabet. I therefore sketched out mouth-regions, divided as it were by lines of latitude and longitude, and endeavored to locate in my chart every sound which I could form or which I could distinguish, whether linguistic or not, so as to bring under review all the varieties that could be produced by the organs of speech. From such a category, I reasoned, the phonetic elements of any and every language might undoubtedly be selected and identified. The undertaking was an arduous one, filling up the night-work hours of many years; but it was at last accomplished, in the system of "Visible Speech" published in 1867.

Naturally, you will perceive, some aspect of my life-topic must still be one of the principal subjects of my thoughts. "Visible Speech" furnishes, in a universal alphabet, the necessary vehicle of a universal language, whenever, if ever, such a bond of human brotherhood shall become an accomplished fact. In the mean time, the system, as an educational implement, performs services both novel and valuable: so I might leave it now out of my thoughts. But I have recently been invited, from an influential quarter, to prepare a popular manual on the subject; and, in working at this, I have developed some new points, which will, I think, add greatly to the scientific value of the system.

The phonetics of our own language have lately claimed my chief attention. Our words have settled into forms irregular, incongruous, and bristling with difficulties to the learner. Every lover of the English tongue must wish that some means should be adopted to render it more easy of acquirement. To us who have mastered the difficulties, each word has, by association, become a thought-picture, of which every letter is a necessary part; and we look upon any disturbance of the orthography to which we are accustomed as we would upon distortion in a drawing. What is called "spelling-reform" is therefore, to perhaps nine persons out of ten, an abomination. If no other means were possible to lessen the labor of learning to read, the objectors to spelling-reform would no doubt yield to the inevitable, and lay aside prejudices and predilections from philanthropic motives; but they cannot be asked to do so while any method remains for obviating the tyro's difficulties without offending the educated, by changing the aspect of our literature.

Thinking on this subject, the idea occurred to let spelling alone, and make a perfectly phonetic version of our common alphabet by limiting each letter to its one most usual sound, discarding unnecessary letters, and designing new letters for unrepresented sounds, so as to form a separate initiatory system for children and foreigners. One primary object was to preserve such a resemblance to ordinary letters as might enable any person to read the new as readily as he does the old. By means of the amended alphabet, the time of learning to read may be reduced to a fraction of that required with common letters, while the exact sound of every word is deduced from the writing of the word itself.

There can be no doubt that a child, or a foreigner, who has learned to read from phonetic letters, will, with little or no further instruction, read also from common letters; and he will learn spelling by the mere contrast with phonetic writing. Spelling is thus always learned pictorially, by the eye, and not mentally, by rule.

One other point. English grammar, as compared with other grammars, is so simple that any alteration in it can scarcely be considered necessary; nevertheless the few existing irregularities may be removed from initiatory books without affecting standard English. I have pointed out elsewhere how this may be done.

English is already the most widely used of all tongues; and the adoption of the amended alphabet will facilitate its diffusion, so that it may speedily become the general medium of international communication throughout the world, — in briefer phrase, world-English.

Interest is hard to be aroused, except when some selfish object is to be attained. We have no personal benefits to be derived from the system which I advocate; but coming generations have, and so has all the outer world. Indifference is not a proper mental attitude in reference to such a subject. National pride, if no higher motive, should urge to effort, and liberality in furtherance of effort,

to render more perfect and more easily accessible, at home and abroad, our noble language and our glorious literature.

Now, I have not only told you the subject that most interests me, but explained the origin of my interest in it, and endeavored to excite your interest in it also. Pardon so much use of the first person. The narrative could not be cast in another mould.

SOMETHING ABOUT TORNADOES.[1]

WHAT are the local signs of conditions favorable to the formation of tornadoes? 1. The prevalence of southerly winds, with a gradual but continued increase of heat and moisture; 2. A sultry and extremely oppressive condition of the atmosphere, which is sometimes characterized as "sticky," or so quiet as to call forth the remark that "there is not a breath of air stirring;" 3. The form, motion, character of development, and place of formation, of clouds. The sudden appearance of ominous clouds, first in the south-west, and then almost immediately in the north-west and north, is sufficient to attract the attention of the most casual observer. In nearly all instances, these premonitory clouds are unlike the ordinary formation which signifies rain, and perhaps a thunder-storm. If the clouds are light, they resemble smoke rising from a burning building; if dark, they present a deep greenish hue, which appears to increase in intensity as the storm advances. Sometimes these dark clouds appear as densely black masses of smoke, rolling upward from the chimney of an engine. The motions of the clouds are peculiar, in that they appear to be rushing from every quarter towards a common centre, making the incipient stages of a gyratory motion in the cloud region. The next step in the progress of development is the appearance of a small darting tongue of cloud, which suddenly proceeds downward from the centre of commotion, and ultimately reaches the earth as the full-fledged funnel-shaped tornado-cloud.

This brings us to consider what are the signs of its approach. The tornado-cloud is, of course, not visible from all directions while sweeping the earth. The limit of vision is necessarily greater in some cases than in others, depending upon the topography of the intervening country. Where the funnel-cloud cannot be seen, its existence can readily be distinguished by the peculiar roaring noise which is likened to the rumbling of distant thunder, or the approach of a heavy train of cars. The noise is said to resemble the "sighing of the wind through the forest." As the storm approaches nearer, the sound increases in intensity until the final crash of the elements, which comes with the suddenness of an explosion. The noise is sufficiently peculiar and distinct to create an alarm, and, as a means of warning, must not be ignored. A few moments before the assault there is a death-like stillness in the air. The observer's eye catches the absence of any movement in the leaves upon the trees, which a moment before danced in a gentle wind. The ominous silence portends grave results, and requires that no time be lost in seeking the most perfect means of safety.

The form of the tornado-cloud in individual cases is somewhat variable; but it always tapers from the top downward, the smaller end being nearest the earth. It is described by eye-witnesses as resembling an "elephant's trunk," "balloon-shaped," "egg-shaped," "basket-shaped," etc. While passing along its path, the cloud is characterized by four distinct motions, which may be designated as (1) the "progressive motion," generally from some point in the south-west quadrant to some point in the north-east quadrant; (2) the "whirling or gyratory motion," always from right to left, or contrary to the movements of the hands of a watch with the face upward; (3) the "curvilinear motion," where frequently the cloud rises from the earth, breaking the continuity of its path for a distance of several rods to as many miles, then returns suddenly to the earth with renewed energy, continuing its violence as before; and (4) the "oscillatory motion," a swaying from side to side of the central line of cloud movement. (This motion is sometimes quite sudden, but generally it is a moderately slow motion, and easily identified: the regularity of it depends upon the frequency and severity of the indraughts of air from the south side of the storm's path into the vortex of the cloud).

[1] Portion of a paper read before the National Geographic Society of Washington, Nov. 16, 1888, by J. P. Finley, continued from *Science*, No. 313.

It is important here to state that the south or right-hand side of the tornado is the most dangerous part of the storm, as it is also in the case of the cyclone. On this side the inflow of air toward the vortex coincides both with the progressive motion of the tornado and with the general easterly movement of the "low," thereby increasing the velocity of the southerly currents. On the north or left-hand side of the tornado the incurving winds oppose the direction of the currents advancing to the vortex, and therefore the force of the wind is very much less on this side: it is therefore the safest side of the storm. The tornado-cloud is swept along by the general currents prevailing in the south-east quadrant of the "low," and whatever may suddenly affect these movements will also extend its influence to the tornado-cloud, and thus increase or diminish its gyrations, sometimes to the extent of withdrawing the cloud entirely from the earth. The tornado continues in the full manifestation of its power until the force arising from the gyrations is no longer adequate to keep the pressure and temperature in the vortex low enough to cause condensation; and therefore the lower part of the cloud vanishes first, the decrease of power continuing until nothing appears on the funnel, and a dark, irregular mass of cloud marks the spot from which the spout had previously depended.

"Windfalls" are the tracks of tornadoes through forests, as shown by the prostrated and confused masses of timber. In many cases there remain but the skeletons of these ruins, and their location is known only to Indians, trappers, hunters, and surveyors. There is not a State east of the Rocky Mountains that has escaped these serrated tracks through its forests, and the record of their occurrence will in many cases be found upon the plats of the early State surveys. Windfalls both of recent and of very early date are still to be found in the forests east of the Mississippi. The late Professor I. A. Lapham of Milwaukee, Wis., attached to the signal corps in 1870–72, made, in the latter year, a very exhaustive and interesting report on the windfalls of Wisconsin. As the result of a very careful examination of the plats of public surveys made within the State, he discovered and marked upon a chart the location and approximate length of path of three hundred and sixty windfalls or tornadoes.

The successful protection of life depends upon the position and surroundings of the observer on the approach of the tornado, the character of motion possessed by the tornado-cloud at the time, the width of the path of the storm, and the velocity with which it is moving.

The following precautions have been determined upon as the result of careful investigation, observation, and experience: 1. The south side is the dangerous portion of the tornado, the north side is the safe portion. 2. In the open country, never undertake to escape from a tornado-cloud without first making sure of the points of the compass, and that the direction which you propose to take is in a line at right angles to the path of the advancing cloud. 3. If the cloud is moving to the north-east, then the line of escape is to the north-west; if to the east, then to the north. Stand facing the advancing cloud in the direct line of its approach, and the safe side is always to the right. 4. To make escape certain, the tornado-cloud should be about three-fourths of a mile distant. This gives the observer a momentary chance to ascertain the character of motion it possesses, the velocity of progression, the width of the path, and the points of the compass. These estimates must of necessity be approximate, but can be made sufficiently accurate to be depended upon. At a greater distance than three-fourths of a mile, it would be difficult, in most cases, for the observer to obtain this information with any degree of satisfaction, unless the atmosphere was clear, and the cloud advancing over the open prairie.

A frame building is safer than one built of brick or stone. The former is more elastic, and holds together longer. The latter goes down in the first crash, and the *débris* is whirled into a heap in the centre of the foundation. This is especially the case where a brick or stone building stands alone. In a block of such buildings, one structure supports another, and there is not quite so much danger of entire destruction. In any event, however, the brick or stone building is the most dangerous, because it so readily crumbles and separates into falling masses, that the inmates are never safe from injury.