3. A waving line, which denotes *nasal* emission.

4. A line closing the curve, which denotes *stoppage* of the breath.

The letter thus says to the reader: —

Stop the breath by means of the lips, and sound the voice through the nose.

It must be obvious that such directions, conveyed without words, will be uniformly interpreted by readers of any nationality who have simply learned the meaning of the radical symbols. All the Visible-speech letters are formed in this way, by synthesis of two or more out of a total number of nine elements. Such letters, consequently, make up an alphabet adapted for universality, because independent of explanatory language; also because its symbols are physiological pictures, and because the writing, even of unheard foreign tongues, is self-explanatory to the reader's eye.

Visible speech was first published sixteen years ago (August, 1867); and it has been very generally studied by philologists, and adopted in theoretical works as a necessary exponent of linguistic phonetics. It has also been widely utilized in America for the teaching of articulation to the deaf. But its popular uses for the teaching of vernacular languages to children and illiterates, and of foreign languages in schools and colleges, as well as for the literation of hitherto unwritten Indian and other tongues, have not yet been correspondingly developed. People generally do not take the trouble to investigate the nature of the characters, but suffer themselves to be repelled by fancied difficulty, — as if what is strange must needs be difficult. But the difficulty is only to eyes unacquainted with the principles of the symbolization. When these are known, there is no comparison, in point of simplicity, between Roman letters and Visible-speech letters. To children and illiterates, all letters are equally strange. To one who can already read, the eye is simply prejudiced in favor of established letters. In the present exposition the *letters* of Visible speech have not been made the basis of illustration, but only the rudimentary symbols from which all the letters are derived. This mode of treatment will, it is hoped, leave no room for prejudice to act.

In this stage of the world's history we do not need to concern ourselves about a universal language: that will develop itself in due time. But a universal medium for the communication of languages is a practical necessity, which every day renders of more and higher importance. Without a universal alphabet there never could be a universal language; with a universal alphabet the progress of the fittest language towards universality will be enormously accelerated. At present, English seems the most likely to achieve this distinction; but its natural fitness is antagonized by its defective and irregular system of letters. Give English the advantage of an alphabet simple and phonetically perfect, and, whereas it is now the most difficult of all tongues for foreigners to learn, it will become by far the easiest.

In the system of Visible speech a universal alphabet is for the first time attained: the system is of English birth. Let its native language have the benefit of this instrument of diffusion, and the world-wide predominance of the speech of Britain and America will be assured. A. MELVILLE BELL.

LETTERS TO THE EDITOR.

Variations in butterflies.

BETWEEN the 20th of June and the 10th of July, I obtained three hundred and eighty Vanessa Antiopa from caterpillars fed on swamp willow. Twenty-five of these were varieties, and the balance were of the usual form. Two of the varieties were Lintneri, from which all the blue had disappeared. The third had the primaries Lintneri, while the secondaries had the usual blue spots. The fourth had the secondaries Lintneri, while the primaries bore the blue spots. In the remaining twenty-one, the whole upper surface of the wings had a mottled appearance, showing that the colors had been disturbed. They retained the blue spots, but the spots were much smaller than usual.

The veins in the twenty-five varieties remained soft for several days; not becoming firm and hard, like the veins in the others, although treated in the same manner. I have also found this softness of the veins in the varieties of Turnus, where the red is suffused, and in the rust-colored specimens.

All the Vanessa Antiopa which I have seen this season have the yellow of a much deeper shade than I have ever before noticed.

Colias Philodice is also remarkable this season in this respect. S. LOWELL ELLIOT.

New York City, 3d August, 1883.

Function of the colorless blood-corpuscles.

The interesting abstract of Zawarykin's important investigations into the function of the leucocytes in the absorption of fats from the intestinal canal (SCIENCE, ii. **192**) calls to mind an investigation by Franz Hofmeister, into the absorption and assimilation of the peptones, which will be of interest in connection with the abstract referred to.

In a series of papers published in 1881, Hofmeister[1] comes to the interesting conclusion, that "absorption of peptones in the intestinal canal is, accordingly, no simple mechanical process of diffusion or filtration, but is rather a function of particular living cells, the colorless blood-corpuscles; and these play, in the nutrition of the organism, a similar rôle to that of the red corpuscles in respiration."

In his discussion he calls attention to the presence

[1] Zeitschr. phys. chem., v. 151.