are ordinarily heard in conversation. If the wire is reversed, you hear the same sounds presented in reverse order. You hear what you would hear if you were to follow the sound waves after they have passed the ear, traveling through them in a radial direction with twice the velocity of sound. The reversed words are perfectly definite in character, and constitute a new language related in a simple mathematical way to that originally spoken. One might learn to pronounce a sentence of this language, thus derived from an English sentence, impress it upon a fresh wire, and the instrument on reversal would translate it into English. This new language might be called the Hsilgne. It is related to the English language in a way that may be roughly represented by the equation

$$\text{Hsilgne} = \text{English} \times \cos 180°.$$

This word forming the first member of the equation is not the English spelling of the word English when pronounced backwards. In order to properly typify the relation between the two languages, not only should the order of the letters be reversed, but each letter should be reversed as to right and left, as when the word is seen by reflection from a mirror.

The ear may, however, be supposed to traverse the system of sound waves produced by an orator, in any one of an infinite variety of directions. The path traversed by the ear, and a radial line drawn to the mouth of the speaker, may make any angle α between 0° and 180°. If the velocity of the ear be correspondingly varied, we shall have in the above case a great spectrum of languages lying between Hsilgne and English. The variable language will in general be represented by the equation

$$\text{Language X} = \text{English} \times \cos \alpha.$$

As the angle α approaches 90°, the variable language becomes more barbarous and inarticulate. When $\alpha = 90°$, the ear would be moving parallel to the wave fronts, and nothing would be heard. The conditions realized are analogous to those which hold in a photographic plate when the fog line is approached, separating the negative from the positive picture. It would be very interesting to determine whether there is any radical difference between the positives and the corresponding negatives of a spoken language. Each language, corresponding to a given value of α with English as a base, would have a corresponding negative, where the angle is $\alpha + 180$. The Poulsen instrument is now perfectly adapted to the study of the relation of any language to its negative, if either be placed on record in the wire. Of course in such a reversal as the Poulsen instrument gives, the grammatical construction is also reversed. Some of the difficulties that would be met in learning to talk Hsilgne can be realized by reading this communication backwards, beginning with the last word and ending with the first. In such a reading the words themselves are not reversed, but the order in which they are presented to the ear is that which would hold in the negative language.

Francis E. Nipher.

QUOTATIONS.

SALARIES AT HARVARD UNIVERSITY.

Speaking roughly, the rule may be said to be that a full professor in Harvard College receives $4,000 a year, an associate professor $3,000, an assistant professor $2,000, an instructor $1,000, and an assistant from $250 to $400. In the last academic year there were in the college 51 full professors, 2 associate professors, 38 assistant professors, 7 lecturers, 1 tutor, 88 instructors, and 87 assistants. Of the professors, 14 received $5,000; 1, $3,600; 10, $3,500; 3, $3,000; 4, $2,000; and 1, $1,000. This showed a total item of salaries of about $227,000. The actual average, based on the exact figures, which are not those given here, was $3,984, which confirms the impression that the Harvard professor is a $4,000 man.

The incomes of the other classes of instructors show similar variations. The two associate professors receive $3,500; but salaries of the assistant professors range from $3,000 down to $500; the average being $2,160. The lecturers average $781 each, while the compensation of instructors ranges from $2,000 to $100, with an average of $999. The assistants

receive anywhere from $1,200 down to $20, the average last year being $328; thus it is seen that a large part of the teaching force of Harvard College is composed of men who receive salaries that would not tempt men to become conductors and motormen on a street railway, and Harvard (*miserabile dictu*) is probably better off than any other American college.

These salaries from the point of view of prosperous Harvard graduates are positively startling, especially if one considers the kind of people with whom a teacher necessarily rubs elbows, if he holds a position in the service of a college. Of course, men don't teach at Harvard or at any other American college of high standing for the mere sake of money. Anybody who is competent to be a full professor at Harvard is capable of securing several times the income of his professorship in some other line of work. The list of teachers contains the names of countless men of world-wide reputation, who by merely signifying that they would accept better positions could step at once into places with a pecuniary return of three, four or even five times what they now obtain.

As has been said, it is probably true that in Colonial days the Harvard teacher was virtually on a financial level with the successful lawyer and the prosperous butcher or baker, as to-day he certainly is not. Until recently, too, the level of salaries in Harvard college rose somewhat rapidly from generation to generation, though never keeping pace with the advances in the emolument of the other professions and trades which college graduates enter.—The New York *Evening Post.*

CURRENT NOTES ON METEOROLOGY.

KITE METEOROLOGY OVER LAKE CONSTANCE.

IN a recent note under the above heading, reference was made to the observations carried on by Dr. Hergesell 'during the years 1900, 1902 and 1903' on the Lake of Constance. The compiler of these 'Notes' desires to correct that statement, for the reason that no observations were made in 1900. The following quotation from Dr. Hergesell's report to the International Meteorological Committee in 1903 makes the situation clear: "In July, 1900, I had the idea of using the speed of a boat to correct the wind conditions, and I made some experiments with a motor boat (on the Lake of Constance), but without raising an instrument. In the month of August, 1901, Mr. Rotch, in America, was the first to lift an instrument in nearly calm weather by using a steamboat which he could manœuver at will. The proposal of Mr. Rotch * * * led me to recommence my experiments on the Lake of Constance (in June, 1902)."

WIND CHARTS OF THE SOUTH ATLANTIC.

THE Hydrographic Department of the British Admiralty has recently published a volume of monthly wind charts of the South Atlantic Ocean, prepared by the marine branch of the Meteorological Office. The region embraced by these charts extends from the equator to latitude 65° south. Nearly a million sets of observations were used in the compilation. The results are shown by means of wind roses in 5° squares. Isobars and isotherms are also drawn, and numerous notes concerning the climatic features along the coast of Africa and of South America are included. It may here be noted that fogs seldom occur north of latitude 30° except near land, and that the southwestern part of the ocean is the only region in which ice is ordinarily found.

SUNSPOTS AND RAINFALL.

MR. H. I. JENSEN, of Sydney, New South Wales, discusses the relations between solar and terrestrial phenomena in the *Proceedings of the Royal Society of New South Wales,* Vol. 38. In general the author agrees with the results obtained by Sir Norman and Dr. W. J. S. Lockyer regarding the connection existing between solar and meteorological variations, but he inclines to the opinion that the epochs of sun-spot maxima are generally the periods of excessive rainfall. One point—an important one—upon which Mr. Jensen insists is the need of laying more emphasis upon geographical position when the meteorological conditions of any place are considered.