is a relation between points. If we had no fixed or relatively fixed datum points, to serve as origins, and to enable us to establish direction lines, we are assured that there would be no space. We should not be able to move if there were nothing for us to bump against. We discover a certain tree in a pathless forest which no foot had trodden before. It has rings of growth and a magnitude which indicate that it must have had a history before it ever came into the thought of man. But its existence dates from its first discovery. It was pure nothingness before.

Let us imagine some unfortunate floater to have spent his life in solitude on a raft in mid-ocean. The water is smooth, the winds are at rest and the sky is continually overcast with a uniform layer of clouds. This we are to assume will involve the conclusion that latitudes and longitudes and compass directions do not exist. The fact that there are other philosophers in Paris who have enjoyed advantages which the floater has not enjoyed must not be considered.

If some of our philosophically inclined brothers would spend a little more time in defining the sense in which they are using words, and a little less time in the futile attempt to define things, the atmosphere would seem clearer. The youthful floater would be somewhat less at sea.

FRANCIS E. NIPHER

THE SATELLITES OF MARS

TO THE EDITOR OF SCIENCE: The letter of Professor Eastman in SCIENCE, No. 695, is my only excuse for taking your valuable space. In consequence of Professor Eastman's letter to the editor of the *Transcript*, there was printed in the paper this explanation: "In the account of the work of Professor Hall presented in the *Transcript* at the time of his death, reference was made to the discovery of the satellites of Mars as 'accidental.' Although the discovery did belong to the class of the accidental because it was unpredictable, still the hastily-chosen word does not describe the conditions upon which the discovery was based. The exact term is a little difficult to catch, speculative and tentative describing in a way the methods by which the observations were carried forward to success."

This note prefaced half-a-column of extract from Professor Newcomb's "Reminiscences" on the same discovery, and together they formed an article that one would not be expected to overlook. Being no longer "live" news, the article was not published till December 21.

With reference to the companions of Procyon seen at the observatory, it was simply the current gossip of the astronomers of the time, fifteen or twenty years ago, lingering in my memory. It illustrated the splendid, sterling qualities of Professor Hall better than any other story that recurred to me during the hurried preparation of the article. It is very good of Professor Eastman to set the world right in the matter, to place the discovery of the fictitious companions where it belongs and to assure us that this bit of gossip has, what most gossip lacks, a foundation.

JOHN RITCHIE, JR.

SPECIAL ARTICLES

COINCIDENT EVOLUTION THROUGH RECTIGRADATIONS AND FLUCTUATIONS (THIRD PAPER[1])

I PUBLISHED recently the statement of a law which I believe to be fundamental in the evolution of organisms, namely, "The Law of the Four Inseparable Factors."[1] It is expressed as follows:

The life and evolution of organisms continuously center around the processes which we term heredity, ontogeny, environment and selection; these have been inseparable and interacting from the beginning; a change introduced or initiated through any one of these factors causes a change in all.

[1] "Evolution as it Appears to the Paleontologist," SCIENCE, N. S., Vol. XXVI., No. 674, November 29, 1907, pp. 744–749. (First paper.)

"The Four Inseparable Factors of Evolution: Theory of their Distinct and Combined Action in the Transformation of the Titanotheres, an Extinct Family of Hoofed Animals in the Order Perissodactyla," SCIENCE, N. S., Vol. XXVII., No. 682, January 24, 1908, pp. 148–150. (Second paper.)