individuals, and that the weight attributable to the differences shown is discussed elsewhere, viz., pp. 516–519. The "Hauptgewicht," it will then be seen, is placed in my table of comparative measurements on page 516, and even in this case with considerable diffidence, as shown by the following qualification: "Although the series is small, the figures probably deserve some confidence, because of their remarkable uniformity and harmony."

As said above, my material was scant and my conclusions, therefore, preliminary and inconclusive. I have received no *authentic* material since and I am at present as undecided about the real status of these *forms* as I was when I wrote my book. Unfortunately, Siebenrock's treatment has not helped much to clear the matter up. True, he is very positive that there is only one *species* and not even another subspecies ("Selbständige Unterarten," p. 1742, whatever that may mean), and with the great respect I have for him as an authority on the Testudinata and my own inferiority in this field, I would gladly have accepted his dictum, were it not that apparently his and my views as to what constitutes "species and subspecies" are so radically at variance that a discussion would be fruitless.[5]

That Siebenrock completely fails to understand my point of view is plainly shown in the last two paragraphs of his article in which he contrasts *A. sinensis* with *A. cartilaginea* and *A. steindachneri* by the young of the former having symmetrical black marks on the plastron which are lacking in the latter, concluding that inasmuch as there are symmetrical black marks in all of my "four species" ("die vier Arten im Sinne Stejneger's") these can only be individuals of the same original form ("nur Individuen der selben Stammform sein können"). As if I ever had denied that the "forms" I preliminarily recognized by name belong to the same "Stammform"! Of course they do. The question is only, has this "Stammform" in its various geographical areas split up into "separable forms," and this I claim Dr. Siebenrock has failed to disprove. I have shown clearly that the black plastral pattern in the Japanese specimens differs essentially from that described by Dr. Siebenrock himself in Annamese specimens, and yet he maintains that these juvenile markings prove ("beweist") the *identity* of these forms.

That I have used a binominal designation for these, in my opinion, "separable forms" does not mean that I regard them as "selbständige" species. Were I to employ for them trinominals I would thereby have indicated that I knew them to intergrade, but that I did not and do not yet know. Maybe they do. Maybe only 75 per cent. of the specimens from each geographical area can be told apart. But if 75 per cent. of the Japanese specimens can be shown to be different from 75 per cent. of the Chinese specimens I shall be satisfied for my zoogeographical purposes to regard them as "separable forms" and to recognize them nomenclatorially. Whether that be binominally or trinominally is at present immaterial.

Leonhard Stejneger
U. S. National Museum,
Washington, D. C.,
April 2, 1908

[5] This is pretty well illustrated by the way in which he takes me to task for not recognizing *Geoclemys reevesii unicolor* (*l. c.*, p. 1760), as a subspecies ("Unterart"), claiming that I regard the "more or less uniform black specimens" as "individuelle Aberrationen." I have not committed myself on that point. To me these specimens represent either a color phase of a dichromatic species, or they are simply more or less melanistic individuals, but I do not know which, and for my purpose it matters little whichever they are. It is admitted that these specimens are found wherever the typically colored *G. reevesii* is found, and color varieties not geographically separated I do not recognize *nomenclatorially*. At any rate, they are not *subspecies* in the modern and commonly accepted meaning of the word.

AN OLD STORY

We are still struggling with variations of the old discussion with which some of our teachers tormented our boyhood days. Did Niagara Falls roar before the country near it was inhabited? We still hear it asserted that space would not exist if we were so situated that we were ignorant of its properties. Space

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.)