each other over the whole surface of the entire field. It was a glory not to be forgotten. This year not a plant of the species is visible riding past. Scattered daisies, golden rod (not *S. nemoralis*), a few *Œ. biennis*, and an occasional lespedeza (*L. capitata*) are all that show. The ground is very sparsely covered, whereas last year it was completely occupied, as indeed also by the daisies, the œnothera, and the golden rod in their respective years.

I am satisfied the same thing takes place on other unoccupied sandy fields about here, but I have not watched them as closely nor as regularly as this one. M. W. V.

Fort Edward, N. Y., July 29.

Worms on the Brain of a Bird.

To judge from Professor French's communication under this title in the current volume of *Science*, p. 20, he is unacquainted with the description and figures of the thread-worm of the snake bird given by Prof. Jeffries Wyman, in 1868, in the Proceedings of the Boston Society of Natural History, Vol. 12, p. 100. Samuel H. Scudder.

A Space-relation of Numbers.

The recent notes and discussions as to certain curious relations observed by some persons between sensations of color and of sound,—relations hardly conceivable by others who, like myself, have never experienced them,—have led me to reflect upon a peculiar conception of my own, which may be called a space-relation of numbers. I have never heard it alluded to by any one; but it has been constant with me since childhood, and seems so peculiar and inexplicable that it may be worthy of mention and inquiry. It is presented, therefore, in the hope that the experience of others may throw some light upon it as a mental phenomenon, and help to show whether it be a mere idiosyncrasy or an experience at all known, and, if the latter, how far familiar, and with what, if any, modifications.

My first distinct recollection of this idea goes back to the age of nine or ten years, in connection with learning the multiplication table. This I was taught, not at school, but by home instruction, and without any use of cards, tables, slates, abaci, or any visible signs or aids whatever. It was purely abstract and *memoriter*. Somehow, then, and ever since, the numbers from 1 to 100 have been conceived of by me as holding, relatively, definite positions in space, from which they never vary,—the mention or use of the number being at once associated with its position relative to other numbers, in the same way that the mention of a well-known country or river brings up a mental picture of its geographical location.

This numerical position has no relation with that of any other object or thing, nor with the position of the body or the points of the compass. In describing it, however, I must employ the latter, but simply as aids, in place of a diagram. The numbers, which are conceived of merely as points or stations in space, appear to be arranged in a peculiar line or lines in a horizontal plane. Beginning with unity, the series runs in a straight line to 20, where it turns ninety degrees to the right, and so goes to 30. Using the points of the compass merely for the present description, as above stated, and not from any connection with the number-scheme itself,—if the series 1-20 runs (say) northward, 20-30 runs always east, 20 being the apex of the right angle. From 30 to 40 the course is *reversed* and runs back westward; at 40 it again turns at a right angle and proceeds south, without interruption, to 90, where the line again turns east from 90 to 100. Above this point, the numbers have the same positions again, and so in each succeeding hundred; so that the same description applies to all.

It will be seen by any one who attempts to put this scheme on paper, that, according to the arrangement, the numbers 30 to 40 would coincide, in reverse order, with 20-30, 40 falling upon the same spot as 20; while 40-60 would coincide with 1-20, in reverse order. But in the mental conception this is not the case. The line 30-40 seems parallel to 20-30, but at some little distance; and a vague sense of space, gradually increasing until no distinct relation is consciously noted, prevents any approach or interference between the numbers above 40 and those below 20. This fact confirms the impression that the idea is not due to any artificial aid in the way of diagram, table, or the like, in childhood.

The only suggestion that occurs is found in the fact that about that period the family had lived for some time in a large hotel (the Delavan, at Albany), whose corridors and numbered rooms may have impressed themselves on the child-mind in some such way. But I distinctly recall that certain of those rooms, occupied at different times by the family, did not at all have the positions that their numbers hold in this mental scheme.

Be this as it may, however, the clearness and the persistence of this association are remarkable, and I should be greatly interested to know if others can report any similar experience. If certain chords in music can suggest the sensation of purple, or the sound of a word a corresponding impression of blue, etc., as apparently is the case with some persons, why may not certain abstract numbers have similar associations of space-position?

D. S. Martin.

New York, Aug. 3.

Preliminary Note on the Cottony Scale of the Osage Orange.

In June I found a Cottony Scale (*Pulvinaria*) in some abundance on an osage-orange tree (*maclura*) in Las Cruces, N. Mex. The young were hatching on and about June 14th. This scale would be referred by modern entomologists to *Pulvinaria innumerabilis* (Rathvon) Putnam, but finding that it did not agree very well with published accounts of that species, I sent to Professor Bruner for specimens of the true insect, which abounds at Lincoln, Neb. Professor Bruner very kindly forwarded without delay a number of examples from box-elder, which were evidently not quite the same as my osage-orange scale.

The box-elder scale, however, agrees with *innumerabilis*, while the *maclura* scale is what was formerly named *maclurœ*, and afterwards sunk as a synonym of *innumerabilis*.

The most conspicuous and constant difference is in the size. In order to show this, I boiled the adult females (which had formed ovisacs) in caustic soda, and spread their skins flat on a glass slide. Thus treated, the measurements were as follows:

P. maclurae (Las Cruces) . . length 10, breadth 10 mm.
P. innumerabilis (Lincoln) . . " 7½, " 5 "

It is thus seen that *maclurae* is both larger and broader in proportion; and no intermediate specimens were found. Another difference is in the length of the fourth joint of the autenna: in the Las Cruces *maclurae* it is about as long as the third joint, whereas in the Lincoln *innumerabilis* it is decidedly shorter than the third. I have not yet examined enough specimens to make sure if this character is invariable. I do not wish to assert positively that *L. maclurae* is a valid species, but its characters are such as have been held to distinguish species of *Pulvinaria* in Europe. I hope to set the matter at rest hereafter by the examination of more extensive material, but it must be admitted at least that it is a very distinct race or variety. In this we revert to the original opinion of Fitch, Walsh and Riley (1855, 1860, 1868), which has been set aside for so many years.