now record the discovery of three species of the larva of the fresh-water *chironomus* new to science, and drawings of which accompany these notes, together with that of another new form found only last week by my friend Mr. A. R. Hammond, F. L. S., on the leaves of potamogeton, forming small tunnels therein. I have made a few mounts of all these species, which will very likely prove to be larvæ of well-known species of flies described by Walker and listed by Verrall, there being over 250 different species of chironomidæ in Britain, while the larvæ of only some dozen are known. Up to the present time the best work on these and similar "eucaphalous" larvæ is that of Prof. F. Meinert, published by the Royal Society of Copenhagen in 1886, full of splendid plates of the larvæ only of fresh-water species, but it is in Danish, and I do not know that it has been translated. None of these new specimens are included therein, and Mr. Hammond, who is well up in the bibliography (he is now bringing out a paper in the transactions in the Linnean Society and shortly to be published on the structure and life history of *Chironomus dorsalis*, in collaboration with Professor Miall), informs me that he has not met with any drawings or description of these larvæ of mine. I may add that Dr. Johnston's drawing of *campontia* does not show the two pairs of long respiratory tubules which the larva can protrude from the eleventh segment and retract again. These are, however, shown very clearly in the micro-photographs of my mounts of *campontia* and *Chironomus dorsalis*. Mr. Slater describes these as being also seen in *C. plumosis* (Ent. XII., p. 87). They are clearly shown in Meinert's drawings as possessed by *C. plumosis* and also by *C. venustus*, but this latter is believed to be the same species as *C. dorsalis*.

In conclusion, I must not omit to make a note of what I feel sure is an instance of the very interesting development known as *parthenogenesis* in connection with *C. dorsalis*. One of the larvæ, fully grown, was put in a bottle late in October, 1891. It sickened and died, but before its death there came forth from the body a large number of young *C. dorsalis*, which ultimately became fully developed, though not so large as the other imagenes. The bottle containing them was in a cold room, and they all appeared in the winter before the end of February, and so could not possibly be hatched from eggs laid prior to October. I watched these most sedulously through the pupa state, for they spun their pupa cells on the under side of leaves, and not in the mud at the bottom of the glass, like the ordinary *Chironomus dorsalis*, waving their heads about in the curious way described by Meinert. They did not assume the strong, deep, blood-red color either, being nearer the surface of the water. There is no question about the flies being *C. dorsalis*, as I have now one or two in spirits of wine. Finding that Mr. Oscar von Grimm had recorded the fact that the pupa of *chironomus* laid eggs prepared in the body of the larva, these ova being deposited in rows of long threads, just as the female *C. dorsalis* does, only that they are protruded through two small holes above the anus of the pupa. I therefore watched the older non-parthenogenetic blood worms most carefully, when they emerged from the larval into the pupal state, and I must say, that never did the proceeding take place, as far as I could see, and during the following month there were no young larva of *Chironomus dorsalis* produced. It is quite evident that further investigation and the closer watching of the life history of these midges will fully repay entomologists, for it is hardly possible to think, after Mr. Grimm's careful and detailed investigations, that his young larvæ were parthenogenetically produced.

LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as a proof of good faith.

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

A SPACE-RELATION OF NUMBERS.

MR. D. S. MARTIN'S article under this head, in *Science* for August 11, is of peculiar interest to me in touching upon a mind experience which I had supposed an idiosyncrasy of my own, since I have been unable to find another person who had any similar experience, except my own mother. I am glad to find another person of a like mind, since it is an indication that it may not be an exceedingly rare experience.

I date the origin of my idea at the time when I began to learn to count, which was at home, by the "purely abstract and *memoriter*" system. Not only are the numbers from 1 to 100, but from 1 to infinity, and all the fractions in a less degree, conceived of by me "as holding, relatively, definite positions in space, from which they never vary." It is simply impossible for me to think of a number except in its relation to the other numbers and in its position in the scheme.

In my mind the numerical position bears no relation to that of any other object or thing, nor to the position of my body; but it does bear a definite relation to the points of the compass. Beginning at my feet the numbers 1 to 10 run due west in a slightly ascending line, 10 being a little beyond and above 9, with 5 above and beyond 4 so that it is given greater prominence. 10, 11 and 12 are arranged in an ascending spiral. 12 is above the plane of 1 say six inches. 12 to 15 are in a horizontal plane in a straight line running W. N. W. 15 to 19 changes to W. by S., slightly ascending, with 20 directly above 19, and about 8 inches above 1. 20 to 30 runs due S. 30 to 60 is a zizzag, 30 to 40 running due E., 40 to 50 S. E., 50 to 60 E. by S. The whole line ascends so that 60 is eighteen inches above 1; but from 20 to 55 the incline is uniform, while from 55 to 60 it is enough more abrupt so that the perpendicular distance from 20 to 55 is just equal to that from 55 to 60, 60 being directly above 59. 60 to 70 runs due S., 70 to 100 S. S. E. 100 is twenty inches above 1. In the whole scheme from 20 onward the multiples of ten are elevated a little above the numbers immediately following and preceding, so that they are more prominent. From 1 to 100 the numbers get more and more distant and indistinct, and consequently appear smaller as they increase in value; but the twenties and fifties seem plainer, but not larger, than the others, as though they were in the direct sunlight, and the others partly shaded. From 100 I drop back to 1 and repeat the course for every succeeding hundred.

The hundreds from 100 to 900 (but not with their units and tens) are arranged in a straight line tending W. by S., scarcely if at all ascending. 1,000 is directly abov 99e 9. 1,000 to 1,000,000 is an indistinct line curving upwards towards S. E. by E. From 1,000,000 onward the tendency is upward and in a S. W. direction; but here a haze envelops the numbers so that they are ill defined and hard to follow.

I conceive of the numbers as being of the same size, but appearing to vary in size as their value in reverse order on account of their distance from the starting point. Therefore in giving perpendicular distances I have given them as they would appear on a chart and not as actual distances. The sense of the true perspective is perfect.

In the application of this scheme to every day use it is

of inestimable value, since it enables me to add with great facility, and perform any simple mathematical operation with ease and dispatch. I have only to conceive of the numbers before me to be arranged in any required way, as in my scheme in their positions, and they are there without further ado.

As I hinted in the beginning, my mother was the only other person known to me to possess this experience. Hers was a conception of a circle of the numbers from 1 to 100, just the same as my conception of the months of the year. I have repeatedly attempted to make a chart of the scheme as it appears to my mind, but have found it impossible on account of the almost constant change of plane and direction, and the sense of gradually increasing space. I know of nothing that could have given a suggestion of the scheme. The impression came too early to have been suggested by any experience, if there had been one to suggest it.

I add this bit in the hope of further drawing out the discussion of the topic, and I shall look with great interest for further notes. LYNDS JONES.

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ENGLISH ORTHOGRAPHY.

A NEW orthography by J. I. D. Hinds, in *Science* for July 21, is cleverly handled, although some slight inconsistencies have crept in, which, I think, the author has overlooked, in his ardor to reform the present method.

English orthography is far in advance of English pronunciation, and it is a fallacy to make orthography conform phonetically to erroneous pronunciation.

The syllables "tion" and "sion" are pronounced "shun" or "zhun," a mistake or rather a wilful corruption of which no other language deriving its roots from Greek and Latin, is guilty. Now if our "dictionary manufacturers" would prescribe "nati-on" and "provi-si-on" (all vowels but the first short) in their next editions, phonetic orthography would not be compelled to use the abominable "shun" of Josh Billings.

All agree that a new system of orthography (I must be consistent and spell this ortho-graphy, second *o* long) should not be an abrupt departure from the present form. But in the first place let us have *re*-vocable in *pre*-ference (first *e* long) to *rev*-ocable, baro-meters and thermo-meters, as weather-meters, etc., etc.

Mr. Hinds suggests the letter "a" for an intermediate sound of "a" as in last, and also "a" for the short sound of "a" as in mat. I fail to note the difference, unless he pronounces "last" (to use his system) laast.

For the present it would, in my opinion, be pre-ferable to retain the present mode of spelling "mate" and "note," and not "maet" and "noet," not because the latter spelling is less correct, but because the change is too radical. For a like reason th, sh and s should be retained as now in use. It is always necessary to consider the present generation to whom such changes would be burdensome, while the rising generation will naturally adopt any plan we offer them. The dipthong ai as in air is unnecessary as "a" followed by "re" will produce that sound as in "mare," "fare," etc. The letter q may be pronounced kawe, and written without the "u" making "quick" go much "quicker." X is used so much for Latin prefixes that it must be retained for reasons mentioned.

These few suggestions will give printed and written pages a more familiar look, than Mr. Hinds's orthography, and easily read at sight. To show the difference between the plan proposed by Mr. Hinds with the amendments I offer, it is best to use the same stanza :

SOUNDS OF IEVNING.

Swiet waas the sound, hiven oft at ievning's klose
Up yondur hil the villaj murmur rose,
Thare as I past with kareles steps and slo
The mingling notes kame sofend from below
The swane responsiv as the milk made sung,
The sobur hurd that lode to miet thare yung
The noisi gies that gabbeld o'r the pull
The plaeful children just let luse from skuel,
The wac-dog's vois that bade the hwispring weind,
Etc., etc.

However it is idle to write and talk without taking action in this matter. Let Mr. Hinds, if he is a pedagogue, call a convention of teachers through the valuable medium of *Science*. Nothing but stubborn lethargy and indifference hinder the progress of reformation in this branch of study. European nations are continually improving their languages, but the English-speaking savant is so perfect that he alone uses a capital "I," when writing of himself. Such a character will not change his position unless he receives a violent push. FREDERICK KRAFFT.

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AN IMPORTANT OMISSION AT THE WORLD'S FAIR.

To any thoughtful student of affairs, with sufficient foresight to look fifty years into the future, and who realizes a few of the elementary facts regarding the appalling destruction of our forests, a visit to the beautiful Forestry Building at the World's Fair brings a sense of keen disappointment.

There is displayed, in admirable order and with scientific accuracy, nearly every fact regarding the location, size, form, color and commercial value of every kind of tree grown in the country, carefully painted or photographed specimens of leaf and blossom, and sections of trees, showing girth, bark, polished and unpolished surfaces, all carefully classified and labelled, giving evidence to the thousands of tourists who drift by with a casual glance that a great deal of painstaking work has been done, which doubtless, as a permanent museum, would be of great value to the specialist, but which, with the limited time of a tourist, can be of little value to nine hundred and ninety-nine out of every thousand who will see it. The only general impression to be gathered from all this elaborate multiplicity of detail, at the time of our visit, was that the United States produced a great variety of beautiful trees, some of them of enormous size, and that, for aught one could see, it would always continue to produce such trees in the same quantities that it had done in the past.

Nowhere was there to be found the slightest hint of the fact that we are *annually cutting off twice as much timber as we are producing.* Not a word to call the attention of the thoughtless passer-by to the importance of forests to preserve our water-courses from alternate floods and droughts, to the ruthless destruction of beautiful mountain scenery, to the urgent necessity of setting out trees on our dreary, treeless plains and barren city streets.

"There ought to be something done about it, sure enough," said a good-natured, heavy-bearded man from one of the Pacific States, with whom we earnestly discussed the matter. "I never really thought much about it, and of course it isn't in my line, for my business is destroying trees, as I'm here representing a lumber firm, like most of the others who have exhibits, but I'll take you to Mr. ———, who is in charge, and you can talk to him." Mr. ——— proved very courteous and somewhat interested in the matter, but didn't know what could be done about it, as his superior had given no directions. "But," we protested, "it could not cost more than ten or twenty dollars to put up a large placard headed: "ATTENTION! FACTS THAT EVERY AMERICAN CITIZEN OUGHT TO KNOW," and underneath in large, clear type, without confusing figures or statistics, give a few of the most cogent facts