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.

Native Calendar of Central America and Mexico.

IN his recent work on this calendar, Dr. Brinton, referring to the mathematical basis on which it is founded, makes the following statement :

"An ingenious theory of the mathematical development of this calendar has been offered by Mrs. Zelia Nuttall. It assumes that at the close of each period of $20 \times 13 = 260$ days, 5 intercalary days were inserted before the next 260-day period was technically commenced. This naturally brought its commencement on the next subsequent Dominical day, and also caused the whole period, 265 days, to equal, very nearly, nine lunations. If it can be shown that the intercalation actually took place, Mrs. Nuttall's suggestion will have cleared up one of the most obscure problems in American archæology."

If I rightly understand the author, there appears to be in this a misconception of the relation of the 260-day period to the solar or ordinary year. If these periods followed one another with intervals of only five days, they could not possibly bear any fixed or determinate relation to the ordinary years. Now I have always supposed, and, from all the evidence I have been able to obtain upon the subject, still believe, that each ordinary year *included* one sacred period, or "vague solar year," as Dr. Brinton terms it. Mr. Cushing informs us that this is beyond question the idea entertained by the Zuñis in reference to their time systems, or, as he expresses it, the sacred period, embracing some eight or nine months of each year, "is the kernel of the ordinary year," being governed, however, as to its commencement and ending by the phases of the moon.

It will also be observed that the same idea appears to be indicated by the time series of the Mexican Codices (as, for example, that on plates 31–38 Borgian Codex). These, we see, are bordered above and below by a line of symbolic figures which we may justly assume—as there are 52 in each line (104 in all)—represent the remaining days of the year—lacking one. As they exactly fill the divisions of the space, we may suppose this was the reason one was omitted, or there may be some other explanation. In other words, I believe the scheme of the plates indicates that the sacred period was *included* in the secular year; or, to reverse it, that each ordinary year included one sacred period of 260 days. If Mrs. Nuttall had said "105 days were added," there would be complete agreement. This sacred period, being, in all probability, regulated to some extent by the moon, would shift somewhat its time of beginning and ending.

I may add here (but expect to present the reasons therefor more fully in a future paper) that there are substantial reasons for believing that we must look beyond the boundaries of our continent for the origin of this calendar. The flower, when we first find it here, is too fully blown to suppose it thus came into existence; there must have been a bud and germ somewhere. These have not as yet been found in other American tribes.

I think we may assume that the natural basis was the revolution and phases of the moon; the mathematical basis the count of the fingers and toes, beginning with five; and that the mystical reference to the cardinal points also entered into its formation. As indicating the line of research most likely to lead to satisfactory results, I refer to the following facts :

According to Mr. Cushing, a particular color was assigned by the Zuñis (as by many other peoples) to the cardinal points, but to the focus or centre a *mixture* of colors, or, in other words, it was said to be "speckled." It is a singular fact that in the old "native" Javanese calendar the week cousisted of five days, each having a particular name. These were supposed to have a mystical relation to certain colors and to the cardinal points. "According to this whimsical interpretation," remarks Crawfurd ("Indian Archipelago"), "the first means white, and the east ; the second red, and the south ; the third yellow, and the west; the fourth black, and the north; and the fifth *mixed color*, and the *focus* or centre." Let us suppose this, as it is so far away, to be accidental.

According to Judge Fornander ("Polynesian Race"), the Hawaiians formerly counted twelve months, of thirty days each, to the year, and added five days at the end of the last month—*Welehu*—to make up the 365, these being "tabu-days." Each month and each of the thirty days of the month had a particular name. He also adds that they had two modes of reckoning time, one by lunar cycles, whereby the monthly feasts were regulated; and the other the sidereal year, which appears to have been regulated by the rising of the Pleiades. He also adds the further important information that the feasts, or Kapu-days, were observed *only during eight months* of the year. This period corresponds somewhat closely with the sacred period of the Central American and Mexican calendar, and also with the sacred period of the Zuñis.

Mr. Dibble, in his "History of the Sandwich Islands" (Edn. 1843), gives some additional particulars, which, though somewhat confused from want of a thorough knowledge of the system, have a strong bearing on the question of the origin of the Mexican calendar. He says the Hawaiians divide the year into two seasons of six months each; that the year consisted of twelve months. He adds further that "In one year there were *nine times forty nights*." Here we find the nine-day series introduced corresponding with the puzzling nine "Lords of the Night" of the Mexican calendar. This coincidence is remarkable. As the change from nine to eighteen and from forty to twenty was simple, we may find herein an explanation of the eighteen months and twenty days of the calendar. "These nights," says Mr. Dibble, "were counted by the moon. There were thirty nights in each month, *seventeen of which were not very light and thirteen were*." These numbers are very significant in this connection. Yet it is apparent that the author, not understanding the system, gives but fragments. In his attempt further on to explain the revolution of the count by the moon and the sidereal year, this confusion becomes more evident and is partially, though not fully, corrected by Judge Fornander. But enough is given to show that the two periods, the sacred and the secular, were in use, and that the system was very similar in its unusual features to that in use among the Mexicans and Central Americans.

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Raining Worms and Frogs.

WHILE reading the letter of a correspondent in the issue of January 7, on "Does It Rain Worms?" I was reminded of Thomas Cooper's statement in his autobiography that he *saw* it rain frogs when he was a boy.

A waterspout on the Yellow River in China will sometimes pour down till it makes the river seem to boil in fury, and then all is reversed, the water in immense quantity is drawn up with the fish, sticks, straws—and even the loose stones from the river bed—and carried along the sky until the wind drops, and then the fish, frogs, etc., fall down, and people are astonished at the marvel. Probably the frogs seen by Mr. Cooper may be accounted for in this way. FRANCIS HUBERTY JAMES.

Boston, January 18, 1894.