LETTERS TO THE EDITOR.

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Pre-Columbian Representations of the Elephant in America.

WHEN I wrote my letter on this subject to NATURE (November 25, p. 340) I was not aware of the fact that another interpretation of the Copan elephants was being seriously adopted in America. The admission of the proboscidean nature of the sculptures in question would place those who indulge in speculations as to the wholly indigenous origin and local evolution of the pre-Columbian civilisation of America in so critical a dilemma that from time to time efforts have been made to discredit the obvious view of regarding them as elephants. In my previous letter I directed attention to the attempts which had been made to convert them into tapirs or tortoises. Certain American ethnologists are now suggesting that the Copan reliefs in question were really intended to represent *blue macaws*!

Ludicrous as this suggestion (Parry, 1893; Gordon, 1909; Tozzer and Allen, 1910; and Spinden, "A Study of Maya Art," Memoirs of the Peabody Museum, 1913, p. 79) may seem to those who examine the features of the unmistakable elephant, which I reproduced in my previous letter, the arguments in support of it are not nearly so lacking in cogency as those with which I have already dealt.

For if the macaw-hypothesis were admitted, it would help to explain the positions of the nostril and eye, the origin of the geometrical pattern around the eye, and, in a vague manner, the presence and form of the trunk (see Gordon, Putnam Anniversary Volume, 1909, pp. 193–95). At Copan there is a beautifully modelled and very realistic representation of the macaw. But the very excellence of the portrayal of the macaw is an argument against the contention that the proboscidean animals can also be meant to be pictures of that bird, even in a conventionalised and extremely modified form. When the American artists set about conventionalising natural objects, an occupation at which they were past-masters, their methods were vastly different from those which such a hypothesis demands. Moreover, the accurate representation of the Indian elephant's profile, its trunk, tusk, and lower lip, the form of its ear, as well as the turbaned rider and his implement, no less than the distinctively Hindu artistic feeling in the modelling, are entirely fatal to the macaw-hypothesis.

The representation of a man sitting upon the head is as wholly inappropriate if the beast of burden is a macaw, as it would be in the case of a tapir or a tortoise.

Nevertheless, this suggestion has served to direct attention to points of special interest and importance, viz., the striking influence exerted by the representation of a well-known creature, the macaw, on the craftsmen who were set the task of modelling the elephant, which to them was an alien and wholly unknown animal. It explains how, in the case of the latter, the sculptor came to mistake the eye for the nostril and the auditory meatus for the eye, and also to employ a particular geometrical design for filling in the area of the auditory pinna.

In a memoir now in course of preparation I have discussed more fully the extensive literature relating to this elephant-controversy, and considered the problems arising out of it. In particular I have directed attention to a most remarkable confirmation of the identification of these American elephants. The series of beliefs which the ancient population of Mexico associated with Tlaloc, their elephant-headed god of rain, thunder, lightning, and agriculture (and the people of Yucatan with the proboscidean Chac), reproduce with the most amazing exactness the essential elements of the Hindu legends concerning Indra, the god of rain, thunder, and lightning, who was also associated with the elephant. Both were associated with the east and with the tops of mountains. Indra's most famous exploit was the slaying of "the snake Vritra, the restrainer, who catches and keeps in the clouds the rain that is falling to earth" (Hopkins, "The Religions of India," 1902, p. 94). Tlaloc is credited with similar performances (Joyce, "Mexican Archæology," 1914, p. 37). In the Codex Tro-Cortesianus Tlaloc is represented treading upon the head of a serpent who is interposed between the rain the god is pouring upon the earth (*Zeitsch f. Ethnologie*, 1910, p. 75, Fig. 837—in my previous letter I wrote "*Archiv*" instead of "*Zeitsch.*"). In the Codex Cortes (*op. cit.*, Fig. 839) the snake is shown coiled to surround and retain the water.

Coincidences of so remarkable a nature cannot be due to chance. They not only confirm the identification of the elephant-designs in America, but also incidentally point to the conclusion that the Hindu god Indra was adopted in Central America with practically all the attributes assigned to him in his Asiatic home.

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The University of Manchester, December 3.

Electric Conductivity of the Atmosphere.

ONE of the Notes in NATURE of November 25 (p. 351) begins with the following sentence:—"The theory that the upper layers of the atmosphere are ionised and therefore conduct electricity, first enunciated by the late Prof. FitzGerald in 1893, . . ." It is a good rule, to which I have always hitherto adhered, not to raise questions of priority, but in this particular case a point of general interest in scientific history is involved, and a claim made which postpones the enunciation of a fruitful idea by six years. In the paper presented to the Royal Society in May, 1887 (Proc. Roy. Soc., vol. xlii., p. 371), I proved by experiment that the gas in a vessel through which an electric discharge passed became a conductor even in regions of the vessel remote from the discharge, and at the end of the paper the application of this result to the conductivity of the regions of the atmosphere affected by thunderstorms and auroræ is quite clearly expressed.

On first reading the paragraph in NATURE, I thought that the writer wished to lay stress on the word "ionisation," an expression I avoided for reasons which I need not enter into here, but on referring to FitzGerald's Collected Papers I find that in the only paper dated 1893 which deals with the subject the word is not made use of, and further, that the author does not claim any novelty for the idea, but refers to the conductivity of the atmosphere as an established fact. The term "ionisation" was first used by Arrhenius in describing experiments similar to mine, made independently but published somewhat later.

To avoid misunderstandings, I may add that in all the experiments above referred to the carriers of electricity, or "ions," as we should now call them, were considered to have molecular dimensions, as in the case of electrolytes. The idea of "corpuscles" of much smaller masses, afterwards introduced with such important results by Sir Joseph Thomson, belongs to a different chapter of the history of the subject.

ARTHUR SCHUSTER.

Yeldall, Twyford, Berks, November 29.