

Letters to the Editor.

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Wireless Communication and Terrestrial Magnetism.

DR. CHREE'S letter in NATURE of Jan. 15 alludes to the names which might be associated with that upper portion of the atmosphere the aid of which is so often invoked to account for many of the facts of wireless telegraphy. May I explain why I happened to choose the name "Heaviside layer" some sixteen years ago?

In the spring of 1902 I was writing from time to time on wireless telegraphy in the pages of the *Electrician*, and one day Mr. Tremlett Carter, the editor, showed me a letter from Mr. Oliver Heaviside which, while discussing other things, asked if the recent success of Mr. Marconi in telegraphing from Cornwall to Newfoundland might not be due to the presence of a permanently conducting upper layer in the atmosphere. I believe this letter was shown to various friends of the editor, but I think it was not published. The substance of the suggestion was repeated by Heaviside in his article in the new edition of the "Encyclopædia Britannica" which appeared in America and in England in 1902. The suggestion was gradually approved during the years that followed; and about 1910 I used the convenient name 'Heaviside layer' in a paper, to indicate the portion of the atmosphere that functions so usefully for the purposes of wireless telegraphy.

The existence of a conducting stratum in the atmosphere, and the probable connexion of the stratum with the aurora, must have been surmised by every observer of electric discharge in rarefied gases even before the date of Cavendish; and as Dr. Chree points out, Balfour Stewart suggested that a conducting layer might have to do with certain variations of the magnetic elements. Schuster, I believe, first gave definiteness and substance to this suggestion. Later, G. F. Fitzgerald calculated the period of electric oscillation of the earth supposed surrounded by a sharply defined conducting layer in the upper atmosphere, thus for the first time introducing the conception of a relationship between electric waves and an upper layer. But, so far as I know, there is as yet no evidence that the auroral layer is the same as the Balfour Stewart or Schuster layer, or that this is the same as the Fitzgerald layer, or that any of them are the same as the physically present layer called for convenience the Heaviside layer. Therefore it seems to me that to call the wireless layer by the name of Cavendish or Balfour Stewart or Schuster, or even Fitzgerald, would assume too much. Why not let well alone until there is proof that the Heaviside layer is the same thing as one or other of the hypothetical layers?

May I take this opportunity of referring to another matter. I wish to urge that full advantage should be taken of the solar eclipse next June for learning more about the Heaviside layer. The map given in Dr. Lockyer's excellent article in NATURE of Jan. 15, leads one to suggest that a wireless transmitting station near London and another in the north of Scotland should be devoted to transmitting signals continually throughout the eclipse period, so that receiving stations scattered about Great Britain might observe the intensity of signals which have

crossed the path of the moon's shadow. Galvanometric measurements of a continuous stream of waves from the transmitters would be the ideal type of observation; but aural observations of the intensity of a code signal, if the time of each observation were accurately registered, would also be valuable.

In the latter case the method devised by the British Association Committee for use in 1914 may be recalled. Each transmitting station—one in Russia, one in France, and one in Ireland—was assigned a sequence of Morse letters for continuous transmission, the sequence of letters being such that no succession was ever repeated. A chronographic record of the transmitted sequence was to be made at each transmitting station, and observers had no other task than to write down the letters heard, heavily when the signals were strong, lightly when they were weak.

It was hoped that analysis and comparison of the records would show the effect of the shadow cone on waves passing through it; but the War came, and the organisation which had been built up for making observations throughout Europe immediately collapsed. Would it be possible, on the occasion now approaching, to arrange similar wide-spread European observations of signals proceeding from a special station in the north of Scotland? Indeed, if short waves were used, observations at a number of selected distant points of the globe would probably yield highly interesting results.

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The Beginning of Agriculture.

MAY I be allowed to make a few remarks on some of the points to which reference is made in Prof. Elliot Smith's letter on "The Beginning of Agriculture" in NATURE of Jan. 15, p. 81?

The observation that "The statement that barley was the staple article of diet in Egypt from the earliest pre-dynastic period has passed without any notice whatever during the last fifteen years," would scarcely be made by any one acquainted with ancient cereals. That barley was an important cereal in Egypt in pre-dynastic and dynastic times is quite certain, for samples of this grain from these periods are well known. Its importance, however, was shared with Emmer wheat (*T. dicoccum*), and from the frequent 'finds' of the latter, often mixed with barley, I think it is probable that both were of equal importance for a long period, after which other races of wheat probably derived from Emmer took foremost place in the diet of ancient Egyptian and Babylonian populations.

The opinion expressed in the letter of Prof. Netolitzky that wheat was not eaten by the pre-dynastic people of Egypt, if based, as it appears to be, on the results of his examination of the material taken from the intestinal tracts of the Naga-ed-Dêr specimens, is of little value. The microscopic analysis of Prof. Netolitzky revealed the presence of barley husks in this material, and the discovery was confirmed by Frau Gherasim. Wheat husks were not found, and their absence Frau Gherasim asserts "definitely establishes the fact that pre-dynastic people did not eat wheat." Such a conclusion, based on the evidence given, is, to say the least, unwarranted. Two explanations may be given of the absence of wheat husks in the intestinal material examined, namely, (1) the human beings concerned had not recently eaten wheat; (2) in barley the husks (glumes) are closely adherent to the grains, and portions of them are consequently consumed with them, whereas in wheat the husks or glumes are free from the grains and must be removed