LETTERS TO THE EDITOR.

CONTENTS.

On the Geiger-Nuttal Relation.

IT is well known that the velocity of the particles emitted by radioactive substances is determined from an experimental measurement of the range and the empirical relation of Geiger-Nuttal, connecting the range with the velocity. An attempt to deduce a similar formula on theoretical grounds, was made by Bohr as early as 1913. Recently, Gaunt[1] and Bethe[2] have deduced the corresponding wavemechanical formulæ. In these theories the classical dynamics is freely used at a later stage, to arrive at a formula somewhat analogous to that of Bohr. Moreover, Bethe's formula involves a function which is computed with difficulty.[3]

According to the wavestatistical theory, which is just developed and is being published elsewhere, the general relation connecting the range (R) with the velocity (v) is of the form

$$R = \ldots + a_2v^2 + a_3v^3 + a_4v^4 + a_5v^5 + \ldots$$

where $a_2, a_3, \ldots$, etc., are constant coefficients. It may be remarked that v^3- and v^4-terms are found to be important, the other terms coming only as approximations. Thus Geiger's v^3- and v^4-rule for low and high velocity, is supported by the wavestatistical theory.

K. C. KAR.

Presidency College,
Calcutta,
June, 1936.

[1] *Proc. Camb. Phil. Soc.*, 1925–27, **23**, 732.
[2] *Ann. der Phys.*, 1930, **5**, 325.
[3] *Vide* Blackett, *Proc. Roy. Soc.*, 1932, **135**, 132,

Constitution of Formic Acid and the Formates.

IN a letter to the Editor Mr. Halasyam[1] suggests that the values used by me for the calculation of the parachor of formic acid[2] were an arbitrary selection of the values of Sugden and of Mumford and Phillips. Actually as indicated[3] in foot-note 4 the calculated value (93·2 units) which I gave is the standard value given in Landolt-Bornstein,[4] the atomic and structural constants used in that calculation being those which are generally regarded as the best. The differentiation between hydrogen attached to oxygen and hydrogen attached to carbon adopted in Landolt-Bornstein is an improvement on the original values of Sugden, which is justified in that it enables satisfactory values of the parachor to be calculated not only for formic acid, but also for a wide range of hydroxy-compounds.[5]

Mr. Halasyam in his original calculation of the parachor of the Sarkar-Ray formula for formic acid[6] used Mumford and Phillips' values. In his recent letter[7] he quotes for the classical formula the value of 102·2 using Sugden's unrevised values which are now out of date, and which also give incorrect values for other acids, for which there is no question of an alternative formula. As indicated in my previous letter, the best modern calculated value for the parachor of the classical formula agrees closely with the experimental value. Mr. Halasyam has nowhere quoted for comparison a Mumford-Phillips value for the