LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of Nature. *No notice is taken of anonymous communications.]*

Extrusion of Columnar Ice-Crystals from Moist Earth.

The phenomenon described by Mr. Larkman (Nature, December 7, p. 269) was noted and studied by Prof. James Thomson in 1864 and later: see notes collected in his "Papers on Physics and Engineering," 1912, pp. 269–71. Rather than freeze on the moist earth below, the water prefers to push up the load above it so as to be free to form a homogeneous mass of ice outside, columns of ice being thus gradually extruded. Prof. Thomson regarded the phenomenon as an illustration of his principle of thermodynamical interaction between congelation and stress or other physical circumstances of the medium, which later became widely extended and defined in Willard Gibbs's classical work. See also G. F. Becker and A. L. Day "On the Linear Force of Growing Crystals," *Journal of Geology*, May, 1916. J. L.

Cambridge, December 8.

The Name "Linethwaite."

In the review of "Cleator and Cleator Moor" in Nature of November 16 the interpretation of *Linethwaite* as *flax-field* (Lin+thveit) is taken as inevitable because of the contiguity of a flax-mill. But history, which cannot be ignored in explaining place-names, does not agree with this solution of the word. The flax-mill has been on this site only about a century. On the exact site of the flax-mill a hundred years ago there stood six conical iron-smelting furnaces. But the field name *Linethwaite* has been here for hundreds of years. Something, therefore, may be said for Lin=Linde, or lime-tree; thwaite=a clearing: the clearing in the lime-trees. The whole district was once forest, and, from time to time, it has been denuded of its timber. The process is going on at the present time. Cæsar Caine.

The Vicarage, Cleator.

It is unsafe to dogmatise about place-names, and, if I have appeared to do so in the instance of Linethwaite, I must plead in mitigation that the suggestion in Mr. Caine's statement that here is "the oldest flax-spinning mill in the country, perhaps in the world," was irresistible, especially as the whole of the district in question was long in Scandinavian occupation. On the other hand, it is extremely improbable that the lime- or linden-tree ever grew in the forests of northern England. Botanists are not unanimous as to whether any species of lime is a true native of the United Kingdom. Even those who admit the small-leaved lime (*Tilia cordata*) to the British list recognise it as indigenous only in the southern and west midland English counties. Mr. Clement Reid seems to have been unable to identify fossil remains of this tree, and Mr. H. J. Elwes observes that "it seems hardly possible that a native tree should have lost its power of reproduction by seed in a climate where it succeeds so well even as far north as Ross-shire. In the north of France self-sown seedling limes are not uncommon" ("Trees of Great Britain and Ireland," vii., 1659). Your Reviewer.

FOOD AND WORK.

Much of what we know about our food has been derived from empiric experience handed down to us for ages. With the knowledge so acquired the human race, under normal conditions, got along comparatively well. In consequence, little attention was given to the scientific investigation of food problems until within the last half-century. Even now the lack of knowledge amongst well-educated people of the composition of foods and their relative nutritive values may not inaptly be compared with that which prevailed in respect to fresh air and ventilation before the discovery of oxygen and its use in breathing. It is not the purpose of this article to trace the various steps by which the gaps in our knowledge of food requirements have been filled. But one important discovery of no distant date deserves mention, namely, that each of our foods has its own particular value in respect to the production or output of work by the human body. A consideration of this aspect of food problems is nowadays of vital consequence to a people, which for the most part is at work to maintain its national existence.

But before referring to the energy-value of foods it should be remembered that the human body, in common with that of every living being, suffers continuous loss every day, due partly to wear-and-tear of its structure, partly to the performance of work, and partly to the production of heat for maintaining body warmth. This loss is made good by food, which therefore has several functions to fulfil, namely, to supply material for structural repair and in early life for growth, to provide energy for the performance of work, and, lastly, to furnish fuel for the maintenance of heat.

Foodstuffs.

If an ordinary suitable diet be examined it will be found to contain certain classes of substances known as "foodstuffs," which have been proved to be necessary for nutrition. The first of these is exemplified by the lean of meat, the white of egg, the casein of milk, the gluten of flour. These are the proteins or albuminous foodstuffs, and it is only from one or other of these that nitrogen can be obtained to nourish the animal body. A certain amount of this class of food is therefore indispensable, and cannot be replaced by any other. But proteins are not all equally valuable. Some, such as gelatin, can supplement other proteins in supplying nitrogen, but by themselves are unable to sustain life; they are "inadequate" proteins. Others, such as the gliadin of wheat and the legumin of peas, are "adequate" to provide for maintenance, for energy, and for heat formation, but not for growth. Still others, such as the casein of milk and the glutenin of flour, are adequate for all these purposes, and for growth as well. Inadequate proteins lack one or more ingredients indispensable for nutrition. It is desirable, therefore, to vary the diet in order to secure a sufficient amount of adequate proteins.

The second class of nutrient substances com-