

LETTERS TO THE EDITOR.

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Ice Thistles.

IN NATURE for January 11, 1917, Dr. R. T. Gunther directed attention to the beautiful form assumed by the air bubbles which separate from water which is allowed to freeze in a small jar. I was able in the issue of February 15 last to describe some larger examples of the same phenomenon.

On December 26 last the ice on the Legs of Mutton Pond in Bushey Park and on the Cardinal's River, which flows through it, was very clear, and the bubbles, separated in the course of freezing, were very obviously arranged along lines of flow. In the pond they converged towards the outflow sill communicating with the river, and in the river they were in lines parallel to the banks. In one or two cases where the stem of a weed was frozen into the ice the course of the water as diverted on either side of it was made clear by curves of bubbles.

On the following day I managed to melt some of the ice over its own water, by the heat of the hand, in a bottle with the bottom cut off and a graduated tube inserted in the neck. Knowing the capacity of the bottle, and measuring the volume of water required to fill it when packed with ice, I got a fairly accurate measurement of the ice. The bottle was then put in a tin can with water, and the gas as it was liberated from the ice passed into the graduated tube.

From 104 c.c. of ice I obtained 1.86 c.c. of gas, of which 0.76 c.c. was absorbed by alkaline pyrogallate. A litre of this ice would therefore yield 7.18 c.c. of oxygen and 10.30 c.c. of nitrogen and argon, apart from any gases which might still be dissolved in the ice. The pond water under the ice yielded 31.2 parts of solid residue on evaporation and 2.35 parts of chlorine, and the melted ice (after settlement of suspended matter) 10.0 parts and 0.39 part respectively.

That the salts yielded by melting ice are no real part of it, but are derived from watery inclusions only, can be shown very beautifully by carrying out Dr. Gunther's "ice-thistle" experiment with water tinted with methylene-blue, or, better, potassium permanganate. A characteristic "thistle" with white silvery rays of air bubbles in a clear hyaline, and a central blue or crimson "egg" of solution much deeper in colour than the original solution, is obtained. This becomes smaller as freezing proceeds. Sometimes coloured veins are seen in the colourless ice, and some of the air bubbles are associated at their inner ends with coloured liquid. This experiment, as showing the separation of dissolved matters, both gases and solids, when a portion of a liquid freezes, seems to be worth noting, especially as it also illustrates the course of the freezing.

J. H. COSTE.

Teddington, January 11.

SCIENCE IN INDUSTRIAL RECONSTRUCTION.

WITHIN the past year or two, frequent reference has been made in these columns to measures of national reconstruction recommended by various committees. There is now a Ministry of Reconstruction, and its advisory committees

are so many that we have almost lost count of them; whilst scarcely a week passes without a report appearing in which promising schemes of industrial organisation and development are projected. The material value of scientific research is usually given due recognition, at any rate on paper; and if we may take these signs as an earnest of things to come, they give us confidence in a progressive future based upon a just and intimate co-ordination of brain and hand.

Though manual and mental workers are often considered to belong to different classes, and an indefensible social distinction is usually made between them, no such separation can be recognised in scientific fields, where fine manipulation, and skill in the use of instruments, are frequently as valuable as fertility in idea and ingenuity in design. Industrial advance seems, indeed, to depend upon three main factors, in all of which brain and hand are related, though in different degrees. First there is the creative investigator whose work reveals new properties and relationships; then comes the inventor or industrial researcher who seeks to apply knowledge to useful ends; and when a practical process or machine has been devised, the artisan is needed to make it fulfil its technical purpose. Each of these three classes has an essential place in national polity; and the correlation of their interests and activities must be the chief aim of all schemes of reconstruction.

Several recent reports and manifestoes are concerned with the combination of these different groups. The Interim Report on Joint Standing Industrial Councils (Cd. 8606, price 1d. net), submitted to the Prime Minister by a sub-committee of the Reconstruction Committee, and referred to as the "Whitley" report, suggests the establishment of district and national councils which should deal, among other matters, with technical education and training and with industrial research and the full utilisation of its results. There has lately been established, under the presidency of Sir Wilfrid Stokes and the chairmanship of Mr. Ernest J. P. Benn, an Industrial Reconstruction Council to encourage the formation of national industrial councils in the several trades, and to offer guidance when necessary. Moreover, the draft constitution of the new Labour Party, which has just been submitted to the Nottingham Conference, has in the forefront of the party objects, "to secure for the producers by hand or by brain the full fruits of their industry"; and the secretary of the party, the Right Hon. Arthur Henderson, informs us that "the term 'producers by hand or by brain' would include scientific workers if they are prepared to accept our constitution and programme. The object in widening the basis of the party is to obtain the assistance of all who depend upon their own exertions for the means of livelihood."

Scientific workers are thus offered facilities for representation in Parliament if they are prepared to associate themselves with the Labour Party. Much can be said in favour of such co-operation,