Several pieces of pig iron were put into a ladle (holding about one ton of metal); these at *first sank*, and a rush of hot metal took place upwards; after a few seconds the pieces of pig iron appeared *floating, with very little of their bulk* above the surface of the molten metal. A piece of flattish metal of irregular shape floated with a small portion alone of its corners above the surface; it was close to side of ladle. Pieces of flat cast-iron bars, 20″ × 2″ × 1″, were carefully placed on surface (the latter being well skimmed); they floated without going below the surface. One of these pieces, which was put in *end on*, kept in this position for a few seconds, with its upper end above the surface; the other end then came up and floated on its flat side. In some cases a sharp crack was heard when the metals touched, and a white flame on one occasion burned like a gas jet from the side of one of the pieces.

The surface of the molten metal was in constant motion due to the currents within its mass, and showed the variegated texture or "break" peculiar to this condition of the metal. From notes of an experiment which I arranged for, but did not see carried out, I find that a cast-iron ball of about 2¾″ diameter, when lowered by a fine wire upon a well-skimmed surface of molten cast iron, *disappeared completely* at first, and then in a few seconds rose and floated with about half an inch diameter of surface exposed; it was then raised from the metal, when it showed a red glow on the lower part. It was again lowered, but now *did not sink*, but floated with about *twice* the surface exposed, as on the first experiment.

Different views are held as to the behaviour of cast iron when passing from the molten to the hot solid state, and finally to the cold (or ordinary temperature) state.

Some hold that the molten metal, on solidifying, expands like water passing into ice, and that it retains this expansion to such an extent that the cold solid is specifically *lighter* than the molten metal. Others hold that no such expansion takes place, and that finally the cold solid is specifically *heavier* than the molten metal. A third view is that the molten metal on solidifying *expands*, and that it then *contracts* during cooling, until it reaches ordinary temperature, when through the cooling it is specifically *heavier* than in the molten state.

From the fact that in foundry practice the linear contraction is taken at $\frac{1}{9}\frac{1}{6}$th part, there can be little doubt that the finally cooled solid is specifically *heavier* than the molten metal; again, from the sharpness of form of iron castings and other circumstances, expansion appears to take place on solidification.

The above experiments, I think, favour this latter view, as the floating took place more readily with small than with large pieces, partly due to their relative bulks and surfaces.

A probable explanation, in part at least of these phenomena, I think, is that the cold metal, when at first put in, is specifically *heavier* than the molten metal, but owing to the great heat around it (over 2,000° F.) it is rapidly heated, and consequently *expanded*, and when sufficient volume has thus been obtained it floats. It is evident that small pieces, being more readily heated, may remain floating, whilst heavy pieces, whose volumes are larger in proportion to their surfaces, will take longer to heat, so as to induce the required change of volume, and may therefore at first sink, remaining below the surface till sufficiently expanded to rise and float. The experiment with the ball bears out this well, as, being a sphere, its surface was a minimum.

These experiments appear to corroborate very well those of your correspondent.

The following experiments which I lately made with lead may be of interest:—

An ingot of lead of 14 lbs. weight was placed on the surface of about 160 lbs. of molten lead; it at once melted. After allowing the metal to cool a little, an ingot was carefully placed on the surface, when it immediately sank, bubbles rising up to the surface; it was heard to strike the bottom of the ladle. Another ingot was tried; it also sank, and could be felt at the bottom (these ingots were cast from the lead in the pot). A small solid piece was cast of about 1½ lb. weight, which also sank. Pieces of *sheet lead* were rolled up and placed on surface; these *floated:* the contained air and great surface in the latter would account for this.

These latter experiments with lead correspond very well with those of your correspondent with zinc. W. J. MILLAR

Glasgow

## Yellow Crocuses

IN my garden the sparrows do not touch the crocuses. In that of a friend, some miles off, they attack the yellow ones exclusively. I address you chiefly to report a fact related to me by the vicar of a neighbouring parish, whose garden is infested with mice. He tells me that for some time he thought he could not grow crocuses at all, as the mice destroyed the corms, discovering and digging down to them, even when there was no trace of the plants on the surface. At last he found that they did not attack the purple crocus, and on his planting the edge of a long border, with alternate clumps of yellow and purple crocuses, the mice almost entirely destroyed all the clumps of yellow, but left the purple untouched. Possibly the purple plant possesses some acrid or bitter taste, rendering it nauseous to animals—the corms to mice, the flowers to sparrows and other birds.

Newton-le-Willows, May 4 THOMAS COMBER

## Hog-Wallows and Prairie Mounds

IF Mr. Williams is right, and the "hog-wallows" are simply American cousins of our "eshars" or "kames," is it not reasonable to credit that "atmospheric erosion" to which Prof. Le Conte attributes the formation of the former with a much more important influence upon the shapes of the latter than British geologists generally seem disposed to accord to it? It is very difficult to conceive that mounds of loose sand and gravel, whether in valleys or on plains, should have retained the impress of the glacier or the iceberg throughout the vast time that must have elapsed since these phenomena entirely disappeared. And if it be conceded that these mounds have been modified in any degree by subaërial denudation, it will be found difficult to limit the extent to which they are indebted to it for their present forms, or indeed to deny that it alone may have shaped them.

Newport, Fife, May 7 JAS. DURHAM

## A "Golden Bough"

IN the gardens of New College, Oxford, there is a fine avenue of horse-chestnut trees, most of which have had some of their lower limbs lopped off, followed by the usual crop of abundant smaller shoots around the original bough. In one tree, however, with respect to one severed branch, these resultant shoots bear, year after year, not green, but pale yellow leaves, the summer through—

"Primo avulso non deficit alter
aureus, et simili frondescit virga metallo."

It would be interesting to know of other instances of such a veritable "golden bough," and whether any explanation can be given of chlorophyll so remarkably failing to develop its blue-green constituent under no obviously peculiar circumstances. It seems a strange anomaly to find an apparent case of host and saprophyte in one. HENRY T. WHARTON

## *SPONTANEOUS GENERATION*

ON Friday evening last the Rev. W. H. Dallinger made an important communication to the members of the Royal Institution on "Recent Researches into the Origin and Development of Minute and Lowly Life-forms; with a Glance at the Bearing of these on the Origin of Bacteria." Biological Science to-day presents us with a magnificent generalisation; and that which lies within it and forms the fibre of its fabric, is the establishment of a continuity—an unbroken chain of unity—running from the base to the apex of the entire organic series. But does this imposing continuity find its terminus on the fringe and border of the organic series, and for ever pause there? or, can we see it pushing its way down and onward into the unorganised and the not-living, until all nature is an unbroken sequence and a continuous whole? That such a sublime continuity may be philosophically hypothecated is to be believed. But that data have been presented to us demonstrating how and by what path the inorganic passes to the vital, the living into the not-living, may be denied. The properties of living matter distinguish it absolutely from all other kinds of things, and the facts to-day in the hands of the biologist furnish us with no link between the living and the not-living. This is an inference which has been fiercely disputed.

But what are the nature of the proofs relied upon to establish the "spontaneous" or not living origin of living things? They were chiefly thermal experiments upon the lowest septic organisms, without an attempt to discover what was their life history, and whether they propagated by germs or not. It was argued that the adult organisms being killed at a given temperature much below the boiling point of water, if an infusion were boiled with every possible precaution, and whilst boiling her-