

LETTERS TO THE EDITOR.

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Humus as a Preservative against Frost.

I HAVE just read a French translation, by my old friend Prof. Henry of the Nancy Forest School, of Wollny's classic work on the decomposition of organic matter. In it I find the statement that spring and autumn frosts are dangerous on peaty soils only when the surface of the latter is dry. Wollny gives no illustrations of this law, but I recently observed one in my garden at Coopers Hill.

Last September I dug up several rose beds on my lawn and sowed them with grass seed, which has produced a fine crop of young grass. This I carefully watered, and the soil in the beds was well trenched and covered with decomposed leaf mould before the seed was sown. The rest of the lawn has not been trenched, probably for thirty years, and the soil under the grass in it; a stiffish loam, is now singularly dry for the time of the year.

On the morning of December 6 there was a slight frost, 31° F. being registered six inches above the grass. At 8 a.m. the lawn was white with rime, except on the new grass, which remained green.

This must be due to the fact that the moist, well-trenched humus soil under the new grass was able to conduct heat from below and thus kept the air in contact with it above the freezing-point, while the dry, compact loam under the old turf could not supply sufficient heat to the old grass to preserve it from freezing. Dry humus, according to Wollny, has a low specific heat and is a bad conductor, while wet humus has a high specific heat and is a good conductor of heat. On another occasion, when snow fell, it melted much sooner on the new grass than on the rest of the garden.

As a further illustration of Wollny's law I may cite the fact that water is let on to cranberry swamps in Carolina when frost is feared during the blossoming period, and also that in north-west India, on clear evenings when frost is feared, vegetable gardens and sugar-cane plantations are irrigated in order to obviate danger from frost.

It is also well known in Germany that if a sphagnum peat bog is to be reproduced, a thin layer of peat must be left at the base of the bog after the upper peat has been removed, and this layer kept carefully under water, as otherwise the drying up and consequent freezing of the peat will kill the moss.

Slight frosts are very prejudicial to vegetation in sub-tropical forests, and, when frost is imminent, the precaution of trenching the soil, removing weeds and irrigating cultivations is extremely important for young sugar-cane and other crops.

Coopers Hill, December 8.

W. R. FISHER.

A possible new Petroleum Field near Naples.

WHEN sailing from Posilipo to Sorrento on August 31 last, at about four or five miles from the nearest land of the Sorrentine Peninsula we encountered a most unmistakable smell of petroleum, just as if a leaking petroleum tank steamer had crossed our bows a few moments previously. Two tracks of the smell were distinctly noticeable, the one at lat. 40° 41' 30", long. 14° 19', and the other at lat. 40° 42', long. 14° 18' 30". A moderate *furano* or southerly wind was blowing at the time, so that in all probability the source of the petroleum was somewhat to the south of the position given.

The only other record of a petroleum source in the immediate vicinity of Naples is that of the Balneum Ollii Petrolei, or *bagno del petrolo*, which formerly existed near the Stufe di Nerone, between Pozzuoli and Baia. This petroleum bath has now quite dried up, but formerly was much praised by mediæval writers for its curative powers in cases of leprosy and cholera, and also because its waters caused the limbs of bathers to rejoice in new found vigour. The last mention of this petroleum bath was by Bartolo in 1679. In the southern Italian provinces petroleum has been found in considerable quantity at San Giovanni Incarico and at Pico in the valley of the Liri in the district of Gaeta. Indeed, in 1878, 600 tons, or almost all the Italian petroleum, came from this source alone. In the last two decades the annual output has much diminished and has become

NO. 1677, VOL. 65]

insignificant as compared with the increased production of the wells in northern Italy. Petroleum has also been stated to occur at Tramutola, on the Gulf of Taranto, and asphalt is recorded from the east side of the Abruzzi, about twenty miles from Pescara on the Adriatic (Redwood).

The depth of the water (80 fathoms) at that part of the Bay of Naples where the smell was noticed is too great for the collection of the petroleum to be commercially practicable. But the long-continued escape of petroleum in the immediate vicinity of the Apennine Limestones of the Sorrentine Peninsula is an indication that deep borings might be successful and might one day yield as profitable a supply of petroleum as the borings in northern Italy. The petroleum fields of the north of Italy near Bologna and Piacenza extend along anticlinals of the Tertiary Limestone, and therefore are geologically similar in many respects to the country in or near which the newly discovered petroleum spring occurs.

R. T. GÜNTHER.

Magdalen College, Oxford, December 13.

Automatic Actions.

As Mr. Dixon points out (p. 102), a mental process frequently repeated becomes automatic.

The impulse passes readily along a path in the brain-cells previously frequently traversed by similar impulses, much as a man who revisits the haunts of his youth may, while in a brown study—that is, while abstracting his mind from conscious direction—find his way unerringly through cross-paths, whereas if he had tried to think out his route he would probably have gone astray.

Mr. Dixon's remarks on the different modes of rising of the horse and cow suggest an explanation. I have hitherto regarded the explanation as due to anatomical differences, but the anatomy of animals has been modified by habit and habit by the necessities of environment.

The horse, which couches on the plain in long grass, rises head first. This method gives him an early view over the surrounding grass and keeps his hind legs (his chief propellers) well under him.

The cow, whose natural lair is under low-hanging boughs, rises tail first. This method allows her till the last moment to keep her eyes upon and her horns presented to an approaching foe.

W. BENTHALL.

December 7.

VARIATION IN FOWLS.

THE recurrence of the large shows of the different varieties of domestic poultry which occurs at this season of the year gives an admirable opportunity to those interested in the subject of studying the characters of the different breeds, and the almost innumerable varieties produced by crossing them. The study of variation has been a favourite pursuit of mine for more than half a century. When Darwin was preparing his works on the "Origin of Species" and on the "Variation of Animals," he was surprised to find, when I was introduced to him by Yarrell at a poultry show, that I had made a large collection of crania of the different varieties. Of these specimens he availed himself largely in his work on "Variation," in which I had the great pleasure of assisting him. I can, therefore, speak with considerable precision of the great change which has taken place in the breeds of poultry during the last fifty years. The figures in Darwin's large work on the "Variation of Animals" were all drawn from birds selected by myself as the most typical specimens of the various races, but I may state that there is not a single figure shown that would not now be repudiated as utterly unworthy of exhibition by the present fanciers, every variety having had its fancy points so greatly increased. To take the figure of the Spanish fowl (shown in chapter vii.), characterised by its white face and large white ear lobe. This represents a fowl which now hardly exists, for the comb has been increased to at least four times the area of that shown by Darwin; the white skin on the face has been so much enlarged as to cause the birds when aged to become