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Irish Industrial Exhibition.

In the June number of the Journal we introduced a description of the Inauguration of Ireland's first Great Exhibition of the productions of her own and other nations' Industry. We now give a series of extracts from the *London Illustrated News*, descriptive of the most important Irish natural and artificial productions.

RAW MATERIALS.—I. TURF OR PEAT.

Among the many raw materials that conduce to the happiness of the human family, fuel fills, perhaps, the most important place. Turf is generally considered as particularly characteristic of Ireland, where it occupies the same position in social economy that coal fills with us. But, even independently of the various uses to which it can be applied, the large area it occupies is alone sufficient to claim more than ordinary attention. The entire surface covered by bog is estimated at 2,830,000 acres, which is nearly one-seventh of the whole of Ireland. Of this quantity, 1,576,000 acres are flat bog, spread over the central portions of the great limestone plain; and the remaining 1,254,000 acres are mountain bog, chiefly scattered over the hilly portions of the country near the coast. As compared to the other mineral substances, (among which turf may be classed), it is of a comparatively modern date. All bogs also abound in timber—principally oak, yew, pine and birch. The oak is generally as black and hard as ebony, whilst the colour of the yew is but slightly changed, to a rich brown or chocolate color. Both the oak and yew are found nearer the bottom of the bog than the pine and birch, and mostly in a position to show that the tree had been upright, even after the formation of the bog had made some progress.

As the bogs vary in depth, position, and appearance, so, too, the turf differs in its characteristics. Some turf is almost as black and hard as coal; whilst in bogs almost in the same locality the turf is soft, and formed of fibrous substances scarcely half decayed. But the chemical constituents differ still more widely, and often, too, in the same bog. Of this an example is given in the "Industrial Resources of Ireland." A section of the bog of Timahoe, forty feet deep, was tested, and the amount of ash it contained was found to vary. The portions near the surface contained 1½ per cent of ashes; the central portions 3¼ per cent; whilst the lowest ten feet contained 19 per cent of ashes. Further experiments show that the turf which is found at a depth of forty feet or more, and consequently subjected to a very great pressure, approximates very closely to coal in its composition, as well as density and color; and, accordingly, we are justified in concluding that turf might be artificially made to undergo this change.

The first difficulty which must be surmounted, before turf can become as useful as coal, is to decrease its bulk; but there is another great difficulty to be overcome. Turf, from its porous nature, retains a large quantity of water. Ordinary turf retains a fourth of its weight; and turf, carefully dried under cover, still retains a tenth; and this is a serious disadvantage, not only because it adds to the weight and bulk of the turf by the addition of a useless ingredient, but because the presence of water robs the

furnace of an amount of heat (in order to expel it in the form of vapor) which would otherwise have been profitably employed.

The most natural method of condensing turf, was the application of great pressure by means of a powerful hydraulic engine. By this means turf was not only compressed into a smaller bulk, but the water it contained was forcibly expelled. Two difficulties, however, were soon found to exist—both arising from the elasticity of the fibres in the turf—an immense power was required, and the fibres gradually expanding, attracted damp from the atmosphere.

To get rid of the difficulties that arose from the elasticity of the fibres, it was proposed to place the turf mould, as raised from the bog, in large tanks, and to have it trodden by cattle, or kept in agitation by machinery, whilst a stream of water flowed through. By this process, the light and fibrous portions were easily separated from the denser, and the latter being permitted to fall to the bottom of the tank in a sediment, was easily dried when the water was shut off. The artificial coal made by this process is hard and heavy, and possesses almost all the valuable qualities of coal.

Nor are the fibrous portions of the turf mere waste. They are at present extensively used at the paper-mills, in the manufacture of the coarser sorts of card-board, known as mill-board, and of which the covers of books, &c., are made, and generally in the manufacture of all the coarser articles made of papier mache. Many specimens of these will be found in the Exhibition.

THE DESTRUCTIVE DISTILLATION OF PEAT.

Turf occupies an intermediate position between wood and coal, the different varieties of turf approaching more or less near to each; and, as both coal and wood have long been used in various processes, it is not surprising that many similar experiments should have been made with turf. The destructive distillation of wood is carried on upon an extensive scale in many localities, both in England and Ireland, and forms an important branch of industry. Its principal products are wood-vinegar, pyroligneous acid, creosote, naphtha, and charcoal. Our readers are still more familiar with the distillation of coal, which is principally conducted upon a large scale for obtaining gas for illumination, but the manufacture of which has incidentally led to the production of several other substances, including coal-naphtha, sal ammoniac, lamp-black, &c. As both these manufactures have long existed as important branches of industry, it is surprising that more enterprising efforts were not made long since with peat, which occupied the intermediate place between the two. As it would be impossible to review the various processes, we shall rest satisfied with a glance at the experiments made by Mr. Reece, at Newtown Crommelin.

In the year 1849, Mr. Reece having brought his experiments to a satisfactory conclusion, obtained a patent for his invention of the process of distilling peat in an air blast, and thereby obtaining certain products. As the matter was one of considerable interest, and of vast importance to Ireland, his process was made the subject of scientific inquiry at the Museum of Irish Industry, and an elaborate report upon it was published. Mr. Reece proposed, instead of putting the turf into a closed vessel or retort, and distilling it as coal is distilled, by the application of external heat, to make the heat generated by its own combustion the agent in its distillation. The turf being placed in an iron cylinder, and the lower portion ignited, the heat so produced acts as the heat of an external fire would have done upon the peat lying immediately above. Thus in the upper part of the furnace, there is a simple distillation and a coking of the peat; whilst, in the lower portion, the combustion of the peat charcoal, as it descends, is