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SOME OF IRELAND'S RESOURCES.

A BRIEF VIEW OF HER VAST INDUSTRIAL UNDEVELOPED WEALTH.

BY

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SOME OF IRELAND'S RESOURCES.

THE unfortunate reappearance of severe distress in Ireland this year reminds all thoughtful and reflective persons of the circumstances and condition of this country, and makes any investigation into the question of its industrial resources more interesting than otherwise probably such a subject might be considered. In England particularly the problem naturally suggests itself whether Ireland is not fated ever to exist in a chronic state of wretchedness and misery, languishing "in ingrained idleness by the shores of its melancholy ocean," and never destined to be permanently benefited by any legislative measures, however great, curative, and substantial. With the thought of all the time that has been spent over Irish matters in Parliament and in the public press, will come to many minds not acquainted with the real state of affairs here, a deepening doubt as to whether any legislative efforts can lift up a nation so prostrate with the weakness of inherent misery, so feeble with the wasting sickness of deep-rooted poverty. Those who hold these despairing views of Ireland's economic regeneration, and in my opinion they form the great bulk of the English people, unfortunately know nothing of the illimitable natural resources of this country. With the "honest-souled and well-intentioned" politicians of the Liberal party who really desire to see Ireland prosperous, there is also a feeling of uneasy dissatisfaction at the apparent ill-success of recent measures to effect all the good expected from them. But all these measures of just and necessary reform, good as they were, and creditable as they are to the genius and spirit of him who has designed and carried them out, can have but little substantial and abiding beneficial consequences if not followed up, strengthened, and solidified by practical economic measures of aid and encouragement towards the development of the vast resources of the country. A tenantry may be made secure in the possession of their holdings. Such a situation is unoubtedly an incentive to industry. But the duty of Govern-

ment does not stop there. Its obligations extend further, and oblige it to see that the community so conditioned by its laws is provided by its instrumentality with the ways and means of best utilising these advantages. If from causes which the power and credit of a State alone can deal with, and because of difficulties which only an organized authority can effectually remove, the internal communications of a country are found to be defective, centres of populations isolated for all commercial or trading purposes, harbours unsafe, agriculture languishing, manufacturing industries, few and feeble as they are, getting less and weaker, the bone and sinew of the country idle or emigrating, and all the while the cost of Imperial and local taxation year by year mounting up, if from legislative incumbrances no fiscal reform can be carried out, if roads and railways are unmade owing to administrative difficulties, an inept and antiquated system of Executive control, combined with the constitutional inability of a people so placed, of themselves, to remedy this disastrous condition of affairs, surely it is the necessity and duty of the Government to provide for these wants. Rich though India may be in its resources and wealth, yet the gigantic railway enterprises and irrigation works there carried out had to be supported by the State and under State control, and what was done in any of those Eastern presidencies is required as essentially, as pressingly, and as urgently in Ireland. Otherwise she must remain in comparative wretchedness, a source of continual worry to her "bigger neighbour," a country tortured with ever-recurring discontent and distress.

Were there not vast possibilities of industrial wealth in existence, capable of such easy and cheap utilization all our patriotic hopes and regrets would be vain and idle, and the sooner the inevitable were accepted the better for all parties concerned. But when it can be shown how well grounded and substantial are our complaints, at least the merit of their being reasonable must be accorded them. The range of my subject is so extensive, its nature so complex, that I can but touch upon the leading and prominent heads of the great general question. Were I to go into it in any detail the utmost limits of this review would be too narrow. I can only cursorily refer to some of the main characteristic points, as they occur to me, so it must not be understood that I presume or attempt to exhaustively deal with the whole subject. To enable my readers

to understand and grasp the prominent features of the several sub-sections, I shall treat them under distinct paragraphs, and amid the mass of statistics before me strive only to concern myself with those most specially important.

Perhaps the first and most obvious consideration that will strike a stranger is whether the Irish soil and climate favour agriculture. A few passing words upon that point may not therefore be out of place.

THE CLIMATE AND SOIL OF IRELAND.

It is many long years since that erratic Welshman, Giraldus Cambrensis, wrote of Ireland thus: "Terra terrarum temperatissima, nec cancri calor exæstuans compellit ad umbras nec ad focos capricorni rigor invitat aeris amœnitate temperieque tempora fere cuncta tepescunt." I shall content myself with his quaint testimony, as true of to-day as it was when written, and proceed to quote a few authorities as to the properties of the Irish soil. "Its exuberant fertility," said Mr. Curwen in 1837, "enables the husbandman to proceed in a manner which, if pursued in England, would long ago have made there a desert of a garden." In the "Statistical Account of the British Empire," MacCulloch writes: "A large proportion of the surface of Ireland is covered with bogs and mountains (seven-eighths reclaimable) but notwithstanding this deduction it contains a great deal of most excellent land. The luxuriance of the pastures and the heavy crops of oats which are everywhere raised even with the most wretched cultivation, attest its extraordinary fertility." Mr. Wakefield, an English agriculturist of great experience, wrote: "A great portion of the soil of Ireland throws out luxuriant herbage, springing from a calcareous subsoil without any considerable depth. Places exhibit the richest loam I ever saw turned up with a plough." And going back to that great observer of men and things, Arthur Young, I will give a few words from him: "It is the richest soil I ever saw and such as is applicable to every wish. It will fatten the largest bullock and at the same time do equally well for sheep, for tillage, for turnips, for wheat, for beans, and in a word for every crop and circumstance of profitable husbandry. You must examine into the soil before you can believe that a country which has so beggarly an appearance can be so rich and fertile." Further confirmation of the superior fertility of the soil may be derived from many agricultural authorities; principally from

Messrs. Johnson and Law's Report in 1843, and M. Moreau de Jonnes's interesting record, in which among other curious facts he showed by careful statistics that the mean average yield in Ireland for wheat, rye, barley, oats, &c., exceeded that of England or Scotland. Sir Robert Kane, speaking of the uncultivated land, said: "The uncultivated land includes bogs and mountains. It has been shown that the area of bog is 2,833,000 acres, of which all is capable of reclamation and of being adapted to productive husbandry, if not required as repositories of fuel. Of the mountainous land also, comparatively little is beyond the domain of agricultural enterprise. The average elevation of Ireland above the sea-level is not more than 387 feet; very little ground indeed lies above the elevation of 600 feet. In fact there is no district in Ireland sufficiently elevated to thereby present serious impediments to cultivation, and scarcely an acre to which the name of incapable of cultivation can be applied. It has been calculated that of the land at present waste, 4,600,000 acres are really available for agriculture, and from my own investigations I am inclined to consider that estimate as certainly not exaggerated."

Here it is in place to give a few significant statistics taken from the latest agricultural returns of 1882, as to the extent of land at present under crops, and the amount capable of improvement. The total area of Ireland is 20,328,753 acres: of which only 15,541,478 acres are productive, and 4,787,275 waste (over twenty-three per cent.), mostly cultivable. Within the last ten years the extent of arable land has *decreased* by 403,000 acres, owing to defective drainage, and those other preventable causes which a liberal system of public loans would at once remedy and rectify. Reclamation could be most easily and economically encouraged, and would prove a source of remunerative outlay.

As to the distribution of land among the inhabitants, we are constantly hearing complaints of the country being over populated and the consequent necessity of emigration. Now taking the agricultural holdings at the figure they are shown by the late Census to reach, that is, 577,739, and dividing the total area of the island amongst them, it results from a simple arithmetical calculation that there could be allocated to each tenant a farm of over thirty-five statute acres. And in a remarkable essay once published by Mr. Blacker, and entitled "Ireland as it ought to be," I find these remarks: "As to the question of a super-

abundant population, the most satisfactory answer to the question will be arrived at by facts and calculations, for if the county of Armagh (which, for illustration's sake, he took as a standard), containing 212,755 acres, gives a population of 220,653, 17,190,726 acres, the entire contents of cultivated land in the kingdom, ought to support a population of 17,828,888 in place of 7,839,469," which was the number of people in the country then. However, the population has been since pressed down to 5,174,836, at which figure it stands to-day. This writer shows further that if a proper system of cultivation were adopted in Armagh its produce could be trebled and the population doubled, which increase being taken as the basis of the calculation and applying it to the whole of Ireland, "would make it adequate to the support of better than *thirty-five* millions of souls." And he added, "when therefore it is considered what unexhausted, I might say unexplored, resources remain for the maintenance of any increase of inhabitants that can be expected in any definite period, it must, I think, be evident to every reflecting person that all fears as to a surplus population are perfectly ideal, and that it is its unequal distribution, and not its aggregate amount, which is to be deplored." Were that writer now dealing with a population as we are to-day, *two* million less, and were he conversant with the great chemical inventions and agricultural improvements introduced since 1843, when he wrote, how much more convinced of the truth of his remarks and the force of his conclusions would he be ? And yet it is firmly believed that Ireland, with an area of over twenty million acres, and a population including soldiery, police, *et hoc genus omne*, of about five and a quarter millions is dangerously overcrowded. A stranger illusion, a more unreasonable belief, a more unfounded opinion, was never held.

We may suffer from an unnatural congestion of population in two of the Western counties upon over-cropped, worn-out patches, but were the vast reclaimable tracts that surround their homesteads by some State machinery handed to these people, or allotments given of land but half productive as it is, not a family would be found in relievable and excusable misery. That the potato is the chief crop raised and depended upon as a means of subsistence in Ireland is a well known fact, yet notwithstanding its consequent vital importance, and the necessity of accurate information being imparted as to its proper care, selection, and cultivation, the recommendations of a Select

Committee of the House of Commons two years ago, suggesting that experiments should be made into the relative growths and disease-resisting qualities of the several seeds, have been practically neglected and unminded. We are now suffering from unfortunate neglect of those wise suggestions, for during the autumn that esculent had largely failed, and is the cause and origin of the present distress. In this instance can be seen the evil and inconvenience of that over-centralized system of government which so often hinders the carrying out of salutary measures. To the ordinary English mind the failure or success of a single crop means a slight indeterminable loss. Let that crop be the potato in Ireland, and that loss means famine. As Dr. Bicheno wrote : " The potato is the only produce the cottier reserves for himself. All the rest—cattle, corn, butter, pigs, poultry, and eggs—go to the landlord. They thrive upon it, and with plenty of ventilation, enjoy good health, and have the cleanest skins in the world. But if the crop fail, or the weather should prove unfavourable for preserving it, the months of April and May are trying seasons—then it is they are driven to subsist on weeds, fevers spread, and the utmost distress prevails." I cannot pass from this subject without noticing how much good could be effected if through the instrumentality of State agricultural schools or model farms, the cultivation of beet root, the more general growth of flax, the rearing of the tobacco plant, and other cognate pursuits were encouraged and taught the people as an alternative agricultural resource. A development of these several industries would alone double the agricultural wealth of the country and almost eliminate the possibility of famine being, as it now unfortunately is, a sure resultant from the failure of a particular crop. The example of France as regards the beet cultivation is well deserving of imitation in Ireland, while as regards flax, nothing in the nature of things prevents its universal cultivation in the other provinces as extensively and successfully as it is grown in the North. The vast tracts of bog now useless, might be planted, and even if the hardy little melic plant were cultivated in some of them, a very useful and profitable material for paper-making would be produced. A judicious aid from an administrative department under the control of a responsible Minister of Agriculture would at little cost effect all those advisable changes so necessary to lift Irish farming industry from its present dull level of uniform and precarious mediocrity.

WATER POWER.

Despite the advantages of a railway as a means of expeditious and cheap communication and traffic, we see in the examples of the Manchester Ship Canal, and similar enterprises projected in France, that a water way, wherever its use is found to be practicable, is superior and more economical. In respect of this natural advantage, Ireland is peculiarly favoured, as she possesses the finest navigable rivers of any country in Europe. The great Irish central limestone region may be considered as sending its waters to the sea by the splendid channels of the Shannon (whose basin is 4,544 square miles), the Suir, Nore, Loughs Corrib and Mask, the Moy, Blackwater, Boyne, Liffey, Dodder, and Tolka. The eastern flank of the Wicklow and Wexford mountains is drained principally by the Slaney, Avonmore, and Avoca. The southern counties of Munster discharge into the ocean by means of the Blackwater, Lee, and Bandon. The principal northern outlets are Lough Erne, the Bann and Foyle, while the littoral counties pour into the sea a number of fine rivers of short courses. The advantages of all these grand natural powers, if utilized, may be gleaned from this one significant fact that between Killaloe and Limerick on the Shannon there is an average available force of water of 33,950 horse power for the 97 feet of fall in continuous action day and night, while between Limerick and Lough Allen it may be computed to be 38,667 horse power supposed to be in constant action. The average elevation of the country being 387 feet, the water which flows in our rivers to the sea has an average fall of 129 yards. From calculations too abstruse to be here inserted, it is found that there is a water power in Ireland capable of acting day and night without interruption from beginning to end of the year (91,061,216 cubic yards, weighing 68,467,100 tons) estimated at 3,227 horse power per foot fall, or for the entire average fall of 387 feet, amounting to 1,248,849 horse power. The geographical distribution of this grand force and its cheap and easy applicability to manufacturing or other purposes present a mine of mechanical wealth of priceless value, if utilized. And yet it must be added, as a sad commentary upon "things as they are" that unhappily all that splendid water power runs on idly and wasted.

FISHERY RESOURCES.

Next in consideration are the Irish fisheries. Ireland possesses 14 harbours for the largest ships, 14 for frigates, from 30 to 40 for medium sized merchant vessels, upwards of 24 good summer roadsteads, and a very large number of harbours for fishing smacks or small sailing craft. Yet with one or two exceptions where, chiefly for defence purposes, harbour works were put up, comparatively little has been done to render them safe, and as a consequence, fishing pursuits are carried on at exceptional risk and danger to the imperilled lives of those unfortunate Irishmen "who go down to sea in ships." This element of constant danger, combined with the want of any encouragement or kindly aid, has brought our fishery affairs to the lowest ebb, and although the coast abounds with shoals of fish, Manx, French, and Scotch boats carry away all these priceless prizes of the sea. The following extract from a semi-official report will show a sad condition of things. "Exclusively of edible fish, properly so called, Ireland possesses oyster banks which yield valuable returns where properly fished, and the lobster fishery would form a most lucrative branch of industry; but it is not efficiently worked. Lobsters exist in great plenty on various points of the coast, yet the English markets derive their principal supply from abroad, while in the Irish markets they are scarce, dear, and often not to be had. The sunfish is also to be found in Irish waters, &c. The herring abounds in them; mackerel, cod, haddock, whiting, &c., swim in the seas in countless myriads." The salmon fisheries employ 11,000 men, and their annual value is estimated by the inspectors of fisheries at £400,000. The herring fisheries employ 2,000 vessels, and realize £100,000 annually. In 1880 the number of men and boys employed in the deep sea and coasting fisheries was 24,548, and the exports valued at £976,765. But all these are capable of great expansion and development. The poor Irish fishermen are unprovided with proper gear, have bad nets, small illfitted boats, and work their precarious calling under every disadvantage that could afflict labour. The subject of aiding and encouraging so fruitful a source of industry was early recognized, and in 1764 grants were made out of the Irish Exchequer, but the Union saw an end to this liberal policy. Year after year since, the matter was brought before Parliament until at length a small annual grant was obtained from

the Treasury to support a national and most important enterprise! But while each successive Government vied with its predecessor in passing over this subject with sad neglect, the poor fishermen were each year decreasing in numbers. The number of the fishing craft has now run down to half its muster, and is dwindling so rapidly as to give promise that in another century not an Irish smack will sail in Irish waters. Side by side with that remarkable decrease is an increased demand for fish in all the great centres of population and trade in England, so brisk a call for the commodity that it would require very little preliminary provision or cost to raise the Irish industry to a most flourishing standard, and by that means throw back upon the Irish shores an amount of wealth now turned to Canada and the States for the questionable tinned stuff that has to satisfy the British craving for edible fish. But unless the redress comes very soon, it will come too late. The evil of the policy of neglect may be realized when it is impossible to correct it; when the industry has died out, its death may be lamented; when the present hardy race have perished by hunger or drowning, it will then be felt what a useful, enterprising, and daring class was permitted to disappear when so little would have saved the race and preserved their occupation.

COAL AND MINERALS.

The stock objection to any demand for the encouragement of Irish manufactures is the difficulty, if not impossibility, of obtaining a supply of available fuel, chiefly coal, in the country. Yet it may not be generally known that there are seven extensive coal districts in the island. As coal is one of the most important and essential ingredients to manufacturing industry, I shall describe, as briefly as I can, some of the principal coal beds in Ireland. It may be necessary to premise that the geological situation of the coal is upon the limestone rock, which in Ireland is more developed than any other portions of the geological series. In England it is often called the "mountain limestone," but such description cannot apply to our stone. Its extent may be fairly imagined, when I state that a direct line of 120 miles from east to west, from Dublin to Galway, touches no other formation, and from north to south, although its markings are not so clearly definable, its mean breadth is about 100 miles. I shall now

venture to describe our most remarkable beds. In LEINSTER there is splendid deposit, taking up the greater part of Kilkenny, Queen's County, and Carlow, bounded on the east by the Nore and Barrow, and ending at the Colliery Hills. This tract forms a vast mineral basin. "The strata consist of beds of slate clay, containing abundant thin veins and nodules of ironstone, compact sandstone, and sandstone slate; with these are interposed beds of fire-clay and the coal beds." Dr. Kane thus summarizes the formation of the Leinster coal beds: "(1) The Rossmore foot coal, (2) the first bed of slate coal, (3) the second bed of slate coal, (4) the four-foot coal, (5) the second-foot coal or Drummagh coal, (6) the first three-foot coal, (7) the double seam, (8) the second three-foot coal." The upper part of the four-foot coal is composed of 5 ft. 5 in. of slaty coal, under which there are 3 ft. of hard coal containing sulphur pyrites, then a bed of black slate clay 6 in. thick, and then a foot of coal. Mr. Griffith estimated its area at 5,000 Irish acres, and its specific gravity at 1·591, and the total quantity of pure coal there may thus be calculated at more than 63,000,000 tons. The coal lies about 140 yards from the surface, on a general average. This description of one of the Leinster formations is sufficient to show the great fuel resources of that province.

Now turning to the MUNSTER coal fields, I shall just notice the Tipperary tract, separated by a neck of limestone from the Kilkenny territory, already described. This extends from Cashel to Freshford about twenty miles, is six miles at its broadest point, and the general nature of the strata may be taken as similar to the neighbouring Leinster formation. But the most extensive coal development in the British isles has yet to be spoken of. This occupies nearly four large counties, namely, Clare, Limerick, Cork, and Kerry. In these there are six layers of coal, according to recent investigations. The coal, from the physical features of the country, lies in a series of troughs, the hills usually striking from east to west, and the strata dipping on either side, north and south, at considerable angles, often perpendicular. This vast tract is completely unworked. The beds of culm present themselves in several places on the west coast of Clare and along the estuary of the Shannon. As to the ULSTER coal-fields, a brief description must suffice. In Tyrone a small, but highly interesting, coal tract occurs. The country around it is described as resembling

a geological museum, as it contains rocks of every description from the granite to the tertiary clays. The Dungannon district is divided into the Coal-island and Anahone districts (the first, six miles by two; area 7,000 acres; second, only 320 acres, a mile in length, one half in breadth). North of Antrim is a small coal district, chiefly noticeable for its contiguity to the great basaltic region of the Causeway. Like St. Etienne in France it rests on mica slate and not underlying lime-stone. In Monaghan there is also a limited coal territory. The hills which surround Lough Allen form the CONNAUGHT coal fields, and they occupy large parts of four counties, namely, Roscommon, Sligo, Leitrim, and Cavan (in Ulster). The greatest length of the district, as ably described by an eminent geologist, is sixteen miles, which is also its greatest breadth. The total area is about 114,000 Irish acres. The rocks are similar to those of other coal fields, consisting of sandstone, sandstone slate, slate clay, clay ironstone, and fine fire-clay. The strata are very regularly arranged, conformably to the limestone on which they rest and contrary to the declivity of the hill. The three-foot coal, as described, examined, and tested by the celebrated geologist Kirwan, is the best for smelting purposes in the Empire. According to his analysis 100 grains are composed of 71·42 carbon, 23·27 mixture of asphalt and maltha, 5·21 grey ashes; specific gravity 1·351. The thickness of the coal is rarely less than 3 feet. One division of it contains 1,200 acres, added to 2,800 of southern division, make 4,000 acres, which at the rate of 7,840 tons per acre will leave upwards of 30,000,000 of tons as the probable output (deducting impurities and waste) of the southern and eastern divisions. The Anghabehy coal-field, near the late Arigna iron-works, was estimated by Mr. Twigg, an English surveyor, at 80 to 100 acres. But were I to go into the figures respecting lesser formations I would outstretch any reasonable limits, so the above facts must suffice and satisfy for the present.

As to Ireland's mineral resources generally, a cursory review must answer my purpose. The clay district of Lough Neagh is similar to the potter's clay district in Devonshire; the same kind occurs in Tipperary, and many years ago considerable quantities of clay were raised and exported from Ireland to England, yet no advantage is now drawn from the material. Except the chaste workings turned out from Belleek there exists no manufactory of delf, china, or earthenware. Belleek, unquestionably,

has proved what rich resources are lying fallow in the Irish soil for the purposes of this manufacture, and what exquisite things can be wrought in it by skilful Irish hands. But the great field of common-place delf and crockery to all practical intents has been left untouched in Ireland. The wealth which this is, is utterly useless to this country. How vast the trade is I cannot say. I believe that in Staffordshire alone upwards of a hundred thousand persons are constantly employed in the potteries, and I know that in Dublin alone more than £30,000 are paid away every year for English earthenware goods. This valuable testimony is borne out by no less an authority than the *Pottery Gazette*, an influential organ of the trade. In a recent number we find an article headed, "China Clay in Ireland," from which the following are extracts: "The proprietors of some works have been fortunate enough to find in the county Roscommon, on the shores of the Shannon, a most valuable deposit of kaolin, which the boats carrying goods from the works bring back as ballast on their return journey. Kaolin is a white porcelain, composed of silica and alumina, from decomposed felspar, or, as it is called, felspath. It is a refractory fire-proof material. Its coarser portions are made into white fire-bricks and gas-retorts, which, being fully equal to any that can be imported, are supplied from these works to the Alliance Gas Company, Dublin, and to the gas companies in Limerick and other towns. Blocks are also made from it for the Great Southern and Western Railway Company. The finest portions of the kaolin are made into glazed sewage-pipes, and could also be worked into the finest pottery and porcelain, but this has never yet been attempted in Ireland." Vesuvian has been found at Kilranlagh; Grenalite occurs in the lead-mines of Wicklow; Cronebane has been found in the mountains of Wicklow and Dublin; Andalusite occurs in the micaceous schist of Djouce Mountain, in Wicklow. A mineral nearly allied to it has been found in great abundance in Killiney. A crystallized mineral of characters very similar to those of indurated talc accompanies the Andalusite. Hollow spar, pitchstone, granular sulphate of barytes, iron pyrites, wavellite, jaspers, amethysts, transparent crystals (commonly known as Kerry diamonds) occur in profusion. Gold was for several years obtained in Wicklow. Silver was got in great quantities previous to the Carlist wars of the seventeenth century. Copper is found in several places. Lead occurs in ten counties. Iron

ores are also plentiful in various parts of Ireland, and in the seventeenth century they were largely and successfully worked until the timber for smelting was exhausted. Along with granite, and many slate quarries, there exists in large quantities the primary limestone. These limestone beds produce beautiful varieties of crystalline marbles of various tints, as white, rose, and dove colour, and in Galway a valuable kind of serpentine striped and mottled, white and green. Blocks of large dimensions of the latter have been raised, and when polished, they are most artistic and chaste. Still, with comparatively few exceptions, we only know by scientific inquiry and not practical utilisation, of the existence of these valuable quarries, for they remain unopened, neglected, and unworked. In the Connaught region also could be obtained an inexhaustible supply of granite suitable for paving streets, but for want of the necessary capital to quarry and supply these stones, even the Corporation of Dublin lately had to have recourse to the Welsh quarries. Although copper and lead-mines exist in several counties, rich in ore, and capable of economic working, but an odd one here and there, with primitive appliances, is open. Along the coast, if but a little sum were expended judiciously by some State agency, a most important industry in the manufacture of iodine from the kelp could be encouraged. This possible source of wealth remains useless for want of that nurturing aid. Professor Galloway recently pointed out in the leading mining journal of England to what a great extent such an enterprise could be pushed by the expenditure of a little money, and showed that all the material and labour abounded, and only waited profitable employment. This industry could be brought to a high degree of perfection, and I know of nothing that would prove more advantageous to the people living in the wild districts of Connemara. It is lamentable to think how little would raise that unfortunate class from a state of chronic misery to one of comfort, and to find that little out of their reach.

With respect to metallic mining, we have first the range of mines of the Avoca, raising but little at present of actual copper ore, but since 1840 productive of very telling amounts of slightly cupriferous iron pyrites, only of late overshadowed by the gigantic importation of a very similar mineral from the south of Spain and Portugal. The south and south-west of Ireland contain large areas remarkable for the occurrence of this

metal. Knockmahon in the county Waterford, and Berehaven in the county Cork, have "proved themselves two of the most profitable mines of the century," according to the account written of them by Mr. Warrington Smith, F.R.S., and "although in the first case several of the lodes have been worked down into very poor ground, and in the second a depth of more than 250 fathoms has been attained, there are reasons for expecting continued prosperity." Moreover, the slaty regions, ranging from Cork down to Mizen Head and farther north, including the stripe of the Berehaven beds themselves, are remarkable for an exhibition at very many different points of beautiful ores of high percentage (particularly bornite or "horse flesh" ore and copper glance). No great measure of success has yet attended the workings at most of the localities in West Cork, but with such an example as Berehaven, and the perseverance which at Ballycumish has carried on workings down to 222 fathoms, the temptation when a good price rewards the efforts of the copper miner, to re-open and systematically to extend some of these mines, should induce further enterprise.

As *granite* is a most useful stone for building purposes, I may say a few words upon the particular kind found in the chief districts in Ireland. Some granites are ternary compounds, but more generally they are quaternary and even quinary, consisting of silica, two varieties of felspar, and two varieties of mica. But in the specimens found in Donegal and Galway, when two felspars are present, they consist of orthoclase and oligoclase. Granite is generally highly silicated, varies much in hardness, and is of such weight that a cubic yard weighs about two tons, contains about two gallons of water, and is capable of absorbing nearly a gallon more on being immersed in pure water for a short time. Its power to resist crushing forces differs much, but I may mention that Mr. Mallett, C.E., found cubes of one inch of granite which he obtained in Ireland capable of resisting a pressure varying from 2,310 up to 13,400 lbs.

The granite districts of Ireland are Galway, Wicklow, Down, and Donegal. The stone of Wicklow and Down is of a greyish tint, and has been extensively quarried both at Kingstown, Newry, and Castlewellan. Donegal produces a beautiful red granite, equal in beauty to that of Peterhead, and capable of receiving a high polish. I refer to granite, because it stands by

prestige and pre-eminence first among building stones, but although I could write much upon the superior character of the limestone and sandstone of the various kinds found in Ireland, I think such an inquiry would be too long. In 1860 certain statistics were published, from which I learn that the number of quarries in Ireland was then 667, but the returns were not full or accurate, and little reliance can be placed upon them in this particular, but as regards England and Wales the table is as exhaustive as it is valuable.

OTHER FUEL RESOURCES.

I have already spoken of the extent of the coal measure in Ireland, so that it is unnecessary to recapitulate or reiterate these facts. Another equally useful but more common fuel remains to be dealt with—the turf. This offers a rare resource, but the chief objection to its use is its want of density. The specific gravity of the light surface and ordinary turf is about 400 (water being 1,000), and from this it increases in compactness of structure until it attains nearly the hardness of coal. That this porosity and bulkiness is an objection may be gleaned from the significant fact that while a cubic yard of coal weighs about a ton, a cubic yard of turf weighs only nine hundred pounds. Turf also contains less nitrogen, and its calorific power is about half that of coal. But if improved machinery were introduced for compressing the turf, its size could be considerably reduced, and its fuel value proportionately increased.

Turf was formerly used in mills, distilleries, and factories, but this custom has gone into desuetude. But as a fuel resource for the country it is positively invaluable. The subject of bog-fuel affects all Ireland, and possesses a degree of economical interest of which the inhabitants of coal countries can form little conception. It is capable of immense extension and development. At present it is only on the outskirts of the bogs that turf is cut, owing to their internal wetness, but were they reclaimed, or drained, the supply might be profitably increased a thousand-fold. The soft vegetable peat mould is largely coming into use in London for the purposes of bedding for horses, &c., being found cleanlier, cheaper, and more healthy (from its powerful antiseptic properties) than straw, &c., and annually increasing consignments are received from the Continent. A few months ago the director of the Zoological

Gardens, Regent's Park, wrote to the *Times* explaining the adaptability of this material for such purposes, and how advantageous it would be found for use in the kennels, stables, &c, but expressed a not unnatural wonder that Ireland, which abounded with such an inexhaustible quantity of the article, was not found able or willing to undertake the work of supply. The want of enterprise arises from causes which might easily be remedied. Turf can be carbonized as wood, and the charcoal, being light and friable, is peculiarly well fitted for many manufacturing purposes.

FARMERS AND RAILWAYS.

The agriculture of Ireland is capable of great improvement and incalculable development. By the judicious use of improved means of cultivation and machinery the land could be rendered more productive than it is under the present relatively primitive system. This want of progress is entirely due to the instability of tenure that had hitherto prevailed; and also to the deplorable want of capital. The illiberal conduct of the banks has a great deal to do with this backwardness, as their plan of business, by renewable bills at short and inconvenient terms, cripples enterprise. Besides, being mainly directed by unpatriotic Irishmen, their principal policy is to put out at interest in any questionable foreign securities the money deposited with them, and which they might have used to good profit in the country they live by, and are supposed to benefit. This however is more particularly felt in regard to the few little manufactures that have struggled to exist. A more enlightened banking policy is one of the imperative reforms of the future. Dairy farming could be brought to a degree of great perfection, and from the prosperous example of the farmers of several southern counties we can form a fair idea of the possibility of the extension of this industry to other parts of Ireland equally well adapted to the purpose. The price commanded by Irish butter in the London markets is a proof of the superiority of the article produced. If schools or institutions were to be established for the training of girls in the art of making up butter, a great amount of good would result. The experiment made in that desirable direction in the South where the Cork model agricultural school was so utilized has been attended with the most gratifying success, and should encourage an extension

and enlargement of the system to the other provinces. If by the same educational machinery the principles of house-feeding for cattle were made "understanded of the people," a great deal more money would be made than there is by the present wasteful plan of half starving the unfortunate beasts in winter and allowing herds and flocks to be subject, without shelter and sustenance, during all that dreary time to the rigours and inclemencies of the weather. Were loans given to small farmers to encourage them to build, in connection with their dwellings, outhouses for their cattle, their portion of profit upon them would be considerably increased. What farmers most suffer from is a want of sufficient, efficient and economical means of transport for cattle and produce to a centre of trade and market. The Irish railways are, as a rule, unequally distributed, and cannot be credited with any liberal notions as to moderate rates of traffic. A general overhauling of their constitution, and an entire enforced change in their conceptions of duty to the public are certain and necessary reforms of the near future. Nothing at present hinders the natural development of agricultural industry more than the narrow-minded and foolish policy of these carriers who have monopolized the public highways. Their diverse and divergent management injures their own as well as Ireland's interests. There is an absence of cordial relations between one neighbouring line and another, and the entire want of competition keeps them at a damaging level of changeless, unprogressive rest. As they were twenty years since many of them, with a conservatism worthy of a better cause, have remained to-day, and to do them justice, show a holy determination to continue consistent. Of course this want of enterprise in so important a factor is against the industrial progress of a country. Under no principle of justice or economy should it be tolerated, and as the boards of directors show an indifference to public censure, such as it is, the only efficient way of dealing with these official anachronisms is by legislative means, compulsorily amalgamating all smaller lines under one supreme control, and appointing a body more useful and efficient than the Railway Commissioners to guide and direct the general policy, determine rates of traffic, train service, and accommodation, upon some basis in consonance with the exigent wants of the time. That for about two thousand three hundred and seventy miles of line (nearly all single) the services of five hundred directors should

be considered necessary is absurd. Yet such is the actual fact. As the Report of the Royal Commission of 1868 stated: "The traffic of Ireland requires special stimulus and development, both for goods and passengers, as except in the case of tourists travelling for pleasure it is entirely of local character from town to town. We are therefore of opinion that the reduction, to have its full beneficial effect, must be on 'short' and 'long' traffic equally, and that the reductions in goods and cattle charges should be arranged on the principle of a uniform rate for all distances." The quickest and most effectual way of settling this difficulty would be for the State to purchase the Irish railways—a project recommendable as much upon grounds of political expediency as for the public interests. Were this done, that the enterprise would be highly remunerative there is no doubt, while an impetus would thereby be given to agriculture that would prove incalculably beneficial. Many important Irish towns are without railway accommodation, owing to the tremendously heavy expense of procuring a Bill in Parliament, and purchasing the necessary land at the extravagant figure which is demanded. The grasping, selfish policy of circumjacent railways dogs every such effort with a thousand expensive obstacles which should be swept away by one general act of the legislature. I would suggest that it be made the duty of a company in the neighbourhood of a town without a railway, and proved by impartial opinion to require one, to provide such upon its own credit, when the wants of the place are deemed sufficient to warrant and recoup the outlay. This compulsory power would at once bridge over little inconvenient gaps that at present cause so much trouble, annoyance, and cost. Such anomalies as no rail junction between two such important adjoining counties as Galway and Mayo—while only twelve miles of iron would connect them—would not exist, as unfortunately they do at present.

IRELAND AS IT IS.

The population of Ireland in 1881 stood at 5,174,836, showing a decrease in ten years of 237,541. The percentage of town population was 24 per cent. for all Ireland, and the agricultural classes comprised 42 per cent., Connaught having the largest, viz., 60 per cent. The domestic class number 21 per cent. in Leinster and Munster, and 14 in Ulster, and the commercial class range from 5 per cent. in Leinster to 1 per cent. in Connaught, and the professional class at 5 per cent. in Ulster are

there at their lowest ebb. As regards the state of education, the percentage of those able to read and write has increased since 1871 from 43·4 to 52·7. The amount of local taxation was £3,292,541. Industrial education is supplied by 59 schools —42 for girls, and 17 for boys, and the number of children therein confined is 5,900. There are 10 reformatory schools—5 for boys and 5 for girls—having in training 1,149 inmates. As to poor law relief, last February 112,968 were relieved, or including asylums, hospitals, &c., 115,595 at a cost of £1,251,600. These statistics I give because they are deeply significant and suggestive. To-day the only remedy for Irish misery that finds favour with so-called economists is emigration. Ireland, we are told, is over-populated. This was said in the time of Dean Swift in 1727, when the population was barely 2,000,000 and to meet and gratify that objection he humorously proposed to relieve the "surplus numbers" by cultivating a taste for roasted babies and bringing to the shambles a yearly supply of 100,000 Irish infants. I am not going into the merits of the emigration argument now, but I assert that such a wholesale and indiscriminate exodus, such a thorough depletion of the population as is now projected by some who profess to be well-wishers to Ireland is as disastrous as it is unjust, as far from meeting the real evil as any measure could possibly be. As was remarked by an eminent economist, "No matter how sparse the population, no matter what the natural resources, are not pauperism and starvation necessary consequences in a land where the producers of wealth are compelled to work under conditions which deprive them of hope, of self-respect, of energy, of thrift; where absentee landlords drain away without return at least a fourth of the net produce of the soil. The famines of Ireland can no more be credited to over-population than the famines of sparsely populated Brazil, and the vice and misery that come of want can no more be attributed to the niggardliness of Nature than can the six millions slain by the sword of Genghis Khan." This section of my subject may be deemed foreign to the question I discuss, but indirectly it throws such light upon the whole matter, that at once its appropriateness and applicability are evident.

Into the general question of the present condition of agriculture, the extent of land under tillage and cultivated, I do not propose to enter. An inquiry into the value of the live stock of the country would also be too elaborate and extensive at

this stage to undertake. I therefore, in the foregoing remarks, endeavoured to confine my attention rather to the undeveloped possibilities of industrial wealth than to touch upon any actual industries. I could say a great deal upon the increased manufacture of woollen goods which this year has seen spring up, but that I consider such a branch of trade so fairly on its way to a respectable degree of prosperity that it would ill assort with the languishing and lost industries I have alone spoken of. The splendid capacities of the country I have but briefly and baldly portrayed. I tried to show what immense and incalculable natural forces we possess in our idle and wasted water-power. I hinted, here and there, at administrative reforms urgently needed to help on our up-hill struggle towards a wished-for industrial revival. All these changes and improvements cannot be effected by the people themselves, and are, as things are at present regulated, the proper and appropriate duties of Parliament. I admit that it would be a feat of human skill and energy greater than that Assembly seems qualified to undertake were it to remedy all these damaging defects arising out of the past and present system of Government in Ireland. But it is within its power, if it ever became its pleasure, to appoint a number of independent men of its own body as a Commission to regulate these matters. A Select Committee of Inquiry is generally a useless, time-wasting, and abortive plan of settlement. It should be an acting, active authority.

I have not referred to the great drain upon the resources of Ireland in the presence of the cancerous evil of absenteeism—an evil which has afflicted the country for the past eighty-two years, and to which more of the bloodshed in recent agrarian troubles, and most of the lives unhappily sacrificed, are attributable. It was apparently the opinion of such a rigid Tory as the Duke of Wellington, that the absentee landlords were to blame for the poverty, distress, and discontent of the Irish people, for on one occasion he remarked, "if persons of estate and property in Ireland would live there, and spend their incomes in it, they would do more to tranquilize the country than all the measures which her Majesty's Government could adopt." I have not dwelt upon this phase of the Irish question, as I believe it impracticable to-day to propose the only efficient check upon absenteeism—a check which Grattan once suggested, but which will find little favour now with any school of economists, and that is a tax upon their rent-rolls. Prior, in 1730, spoke strongly of that burden upon the country,

and in 1797 Mr. Vandaleur, in proposing a resolution to tax the absentee landlords, declared "that all the disturbances which had taken place in the country which had disgraced its character and checked its growth, have been found on the lands of absentees." A "truth true of all time." One of the worst features of this vicarious system of ownership is that it occurs usually in the poorest parts of the country. This is most remarkably evidenced in the county of Mayo, where all the principal owners of land in it are absentees. In Galway the same cause of trouble and source of misery operates. But further into this and cognate subjects I could not venture, so it must suffice just to allude to these mainsprings of misery that deter industry, hamper trade, and maintain a condition of comparative wretchedness and want. I, on the other hand, have concerned myself chiefly with the main sources of natural wealth, undeveloped and unutilized, and tried to show by inference that if the State lent the security of its credit to such enterprises as would utilize and develope them, an incalculable amount of material good would be the result. The Irish people are willing and anxious to labour, if but the opportunities of employment are afforded them, and were these given we might then look upon a happy and prosperous people, a country busy with active industrial life, and utilizing those great powers Nature has dowered her with, her grand streams turning thousands of manufacturing mills, her vast mineral wealth unearthed and useful, her fertile pastures freed of the water which now rots them, her extensive bogs rich with verdant reclamations, the hardy fir and towering elm growing where but a sour rank vegetation pre-existed, her iron highways replete with a teeming traffic, and in the midst of that changed scene her people of every class and creed living in brotherly amity and cordial friendship, society untarnished by crime, and progressing under the genial influences of religion and education until that possible condition of affairs were reached most aptly described in the following eloquent words of Milton, with which I shall close my remarks: "Methinks I see in my mind a noble and puissant nation, rousing herself like a strong man after sleep, shaking her invincible locks; methinks I see her as an eagle muing her mighty youth, and kindling her undazzled eyes at the full mid-day beam; purging and unsealing her long-abused sight at the fountain itself of heavenly radiance."