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# A D D R E S S

READ BEFORE THE

Institution of Civil Engineers of Ireland,

BY THE PRESIDENT,

JAMES DILLON, Esq., M. INST. C.E.,

ON THE

PUBLIC WORKS THAT IRELAND NEEDS.

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Sixty-third Session, to May, 1897.

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DUBLIN:  
PRINTED FOR THE AUTHOR  
BY JOHN FALCONER, 53 UPPER SACKVILLE-STREET.

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# ADDRESS

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By the President,

JAMES DILLON, Esq., M. INST., C.E.,

ON THE

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GENTLEMEN,

I thank you for the honour you have conferred on me in electing me to be your President, an honour I will ever highly prize.

The last President who addressed you from this Chair was the late John Chaloner Smith, so well known as the Engineer of the D. W. & W. Railway and its extensions, and for the great services rendered by him in his capacity as Hon. Sec. to this Institution from the year 1877 to within a short time of his death in promoting its interest in every way in conjunction with others; obtaining its Royal Charter, and furthering the building of the Lecture Hall I now address you in. Few will ever know in how many ways he enlarged and advanced the interests of this Institution and of the profession generally in Ireland, and when he was approached to accept from this Institution some token of its esteem for him, he said, “I have only done my duty for which I can accept no reward.”

It was then suggested to establish and provide for the

Chaloner Smith Annual Premium to be awarded by the Council to deserving authors of papers read before this Institution, which suggestion has been adopted, and was a source of great satisfaction to him.

On the expiration of his year of office, the late James Price, the Chief Engineer for so many years of the M. G. W. Ry. of Ireland and the Royal Canal, was elected President, and deeply do I regret to record that death removed him from amongst us before his term of office expired, greatly regretted by the members of his profession on account of his character and his determination to uphold and maintain the position the profession enjoys in this country for its integrity.

Without your hearty co-operation and support, I fear it will be difficult for me to follow in the footsteps of these and other eminent men who have occupied this chair as your President—such men as Sir John F. Burgoyne, George W. Hemans, Michael B. Mullins, Sir Richard Griffith, Charles B. Vignoles, Robert Mallett, Sir John Ball Green, and other equally eminent men still in the practice of their profession.

The Institution of Civil Engineers of Ireland can now boast of being one of the oldest engineering institutions in the United Kingdom, and the Engineers of Ireland have in recent years found the great importance of having such an institution situated in Dublin, being the most central city, to watch over the interests of their profession.

Here, in 35 Dawson-street, we have now our Library, Reading-room, and Lecture Hall, and by your co-operation in bringing forward papers on engineering and kindred subjects at the General Meetings usually held on the evening of the first Wednesday of each month during the Session, which extends from November to May, and by your taking part in the discussion on all such papers, will render our Transactions when printed valuable as books of reference to the professional com-

munity as well as to the public. The Council, as you may be aware, are always prepared to receive short papers on any subject of interest connected with the profession, and to the authors of approved papers they have the power of awarding Mullins' Gold and Silver Medals and also the Chaloner Smith Premium of Books.

I propose to address you on the public works that Ireland needs for the proper development of her resources, including her agriculture, deep sea and inland fisheries, and her great live stock export trade and other matters.

In recent years the people in Denmark, Holland, Switzerland, Austria, Hungary, Bavaria, Belgium, and France have been receiving from their respective Governments great assistance, such as State Aid, for scientific and technical education, agricultural societies, proof fields, improvement of breeds, schools of engineering, arterial drainage, construction of inland waterways, canals, harbours, and perfect railway systems, with cheap fares and through rates, with roadside stations or stopping places at short intervals for the accommodation and development of enormous volumes of traffic, at rates, many of them 100 per cent. less than Ireland has to pay. Bavaria even now has her 3,750 miles of railway spread like a net over the country, while Holland has a magnificent canal system of many thousand miles in length.\*

Some of the railway freights are as low as 6s. per ton per 100 miles; in other places the average is 5s. to 10s. per ton per 100 miles, water-carriage freights being less, and the farmers receive financial aid in many ways. These countries are densely populated, the people are better educated, more contented, better fed and clothed, and have larger balances with their bankers than the people in Ireland.

The combined effect of all these great advantages is such, that large volumes of Continental agricultural produce are

\* See Report of Recess Committee (Ireland), 1896.

sent into England at less cost to the foreign farmer, and frequently of better quality, as in the case of Danish butter, there to successfully compete with, and, if possible, drive Ireland's agricultural produce out of the English markets.

This state of things could not have been brought about without active co-operation of the people in all matters combined with the ample system of public works provided by their Governments for the accommodation of their people, down to and including their deep water harbours and seaports, from whence, with the aid of one of the greatest modern improvements, the triple expansion marine engine, in a comparatively few hours this enormous produce, representing many millions of money in the year, can be safely delivered over all parts of England, and, perhaps, over Ireland as regards some articles.

During this extraordinary state of things the farmers of Ireland, practically with no sufficient aid from the Government, and having to pay very high traffic charges when sending their goods to England, and having in many parts of Ireland, a wet climate to cope with, find it very difficult, without the advantages secured by an ample and proper system of public works, to successfully compete in the English markets with the foreign farm produce.

Then as regards Ireland's fisheries, according to last year's returns the total value of the fish taken was £288,000, the East and South Coasts producing £188,000, and the West and North Coasts producing £100,000 including shell fish, but exclusive of salmon ; while Scotland last year received for the same class of fishing £1,800,000, employing 49,000 men and boys, while Ireland only employed 25,000. This is partly due to the fact that, as the Scotch can command financial help, they have good decked sea boats and deep water harbours to shelter them.\*

\* See Report of the Inspectors of Irish Fisheries and Thom's Directory for 1895-96.

## CONDITION OF THE EXISTING PUBLIC WORKS HARBOURS.

The following harbours are partly used for fishing purposes—Kinsale, Arklow, Kilrush, Foynes; and the five Royal Harbours—Donaghadee, Ardglass, Howth, Kingstown, Dunmore.

There are 58 piers executed under the Act, "Fisheries Piers (Ireland), 46 & 47 Vic., c. 26." Nearly the whole of these piers are dry at low water, except three—Ballycotton, Malin Head, and Clogher Head Piers, having a depth of about 12 feet at low water, the minimum depth required for good decked boats for deep water fishing. These piers cost £237,965.

There are 38 piers executed under the Act 43 Vic., cap. 4, nearly all dry at low water, except Teelin Pier, having a depth of 15 feet at low water—they 38 cost £63,011.\*

Then there are about 158 smaller piers around Ireland, nearly all dry at low water (except seven of them), practically useless for deep water fishing, and unconnected with the railways, with a few exceptions.

In the Royal Commission Report on Irish Public Works, 1888, will be found the following passage dealing with this subject:—"Clearly no great development of fisheries can be looked for on the south, west, or north coasts, in the absence of proper sea-going vessels, in respect either of total quantities taken, of the certainty of a livelihood being made, or of greater enterprise in following shoals of fish from place to place, and in seeking out new grounds and sources of supply. We may say at once that in our opinion the key to the development of Irish deep sea fishing elsewhere than on the

\* See Appendix to the Second Report of the Royal Commission on Irish Public Works, 1888, page 709.

east coast, is the question how the general use of decked sailing vessels of considerable tonnage may be attained."

Again, in the year 1883 the Select Committee of the House of Commons on Harbour Accommodation reported with reference to Ireland thus:—"That a very large portion of the money to be expended should be devoted, not to the multiplication of fishery piers, which are already numerous, but to the construction of real harbours with, where possible, a considerable depth of water at low water spring tides."

The same Royal Commission of 1888 referred to the last-named recommendation as follows:—"Instead of the bulk of the money being spent on efficient harbours, little or no attempt has been made to provide such works; and almost all the money has been expended on small piers or harbours inaccessible at low water. We ourselves, as already indicated, are strongly in favour of the proposition laid down by the Parliamentary Committee, and we think the action of that Commission (appointed under the Sea Fisheries Act of 1883) was ill advised, and that much money has consequently been wasted."

I trust I have made it clear that Ireland is urgently in want of a suitable number of deep water harbours near her fishing grounds to secure some of the fish now taken away by large decked boats belonging to other countries, for which large sums of money are received and not spent in Ireland.

I am aware there are more than 50 naturally sheltered areas in which deep water harbours could be built without being submitted to the full force of the open sea (or even the Atlantic wave on the west coast), thus enabling the cost of such harbours to be largely reduced.

#### RAILWAYS.

Ireland, including her light railways recently constructed, has not yet her proper proportion of railways.

England has 1 mile of railway to every 3 square miles of country.

Scotland	Do.,	do.,	do.	9	do.
Ireland	Do.,	do.,	do.	10	do.

England has 1,920 acres of cropped land, including pasture, to each mile of railway,

Scotland has 1,521	Do.,	do.,	do.
Ireland has 5,069	Do.,	do.,	do.

In twenty-five or more different parts of Ireland there are 100 or more square miles of cultivated country without any railways at all, or 2,500 square miles in all.

Ireland has now of a 5ft. 3in. standard gauge, 2,847 miles.

Do.	narrow gauge, 3ft. or less,	326	„
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Total over, 3,173

The numerous existing Railway and Tramway and Light Railway (Ireland) Acts have become almost unworkable (I do not refer to the short Act passed this year, until it is seen how it is worked). In proof of this I refer you to the various decisions given by the Privy Council in Ireland and in our Law Courts.

Thus, the great central plains of Ireland are left out in the cold, where no free grants for railways have been given, and where, as I before stated, hundreds of square miles of country are still left without any railway accommodation.\*

There are serious gaps in the railway systems in Belfast, Dublin, New Ross, Waterford, and Cork, where there are no through trains, not even from Kingstown to Howth, and where tourists constantly fail to make connection with the trains required, with the exception of the morning and evening mails to and from England, *via* Kingstown; but Kingstown

\* See Evidence given before the Royal Commission on Irish Public Works, 1888, by James Dillon and other engineers on Light Railways.

passengers with luggage have to travel to Dublin before getting a through train beyond Dublin.

Practically in Ireland the passenger and goods trains of one company are not allowed to run over another company's railway, with one or two exceptions—at Dublin, Belfast, and Waterford, &c.

The Government have the exact figures in their possession representing the amount of aid they were required to give for the construction of these 236 miles of light railways, and the annual contributions required for their maintenance, &c., including the 216 miles made partly by the county's guaranteeing and partly by the Government guarantee, &c.

It has been proved the public have kept back from investing their money in non-guaranteed light railways; the counties, in many cases, refuse to give any more guarantees for railways, pointing out how much more cheaply railways can be made with the aid of Government guarantees than with county guarantees.

From this it will be seen that it is the Government alone that are in a position to find cheap money for the completion of the harbours and railways, both forming one system; and that it can only lead to the loss of valuable time, retarding the progress and development of the country in waiting for the passing of new Acts of Parliament, with the view to the adoption of patched financial schemes.

One word as to gauge. The standard railway gauge of Ireland is 5ft. 3in., and out of the 3,173 miles there are only 326 miles of a narrower gauge.

It would be a great misfortune now to introduce into Ireland a further break of gauge (the country is too small to justify it) because it would require additional outlay on extra rolling stock, additional maintenances, and delay, if not damage, in the quick transit of perishable goods. In this view of the

case the Royal Commission concurs, and I think also the Government.

There may be an exception made in the case of Kerry and Donegal, and such remote mountainous districts, where they have their own seaports connected with the narrow gauge systems; but in a non-mountainous country the saving to be now effected by reducing the 5ft. 3in. gauge to a lesser one is doubtful.

We now know, and I have always held the opinion, that Parliament put an unnecessary tax upon Ireland in compelling her to construct her railway system on the unnecessary broad gauge of 5ft. 3in., when it is universally admitted that a 3 ft. gauge would have met all the requirements of this country, as England, with her enormous wealth and immense volume of trade, can successfully work it on a 4ft. 8½in. gauge, an additional argument, if another was required, why material help should now be given to Ireland to complete her railway system.

The new Railway Act (Ireland), 1896, so far as it seems to get rid of the costly Private Bill Legislation, and other red-tape formalities as regards railways, will, I believe, prove a most useful Act; but the amount of the grant—£500,000—to complete the railway system of the country is but a fractional part of the money urgently required.

Assuming the average cost of the lines to be made will reach £5,000 per mile, it only gives enough money to construct four railways, each twenty-five miles in length; therefore the proposal is a disappointing one, the country having waited so many years for a liberal contribution for Irish public works, and it is not publicly known how this £500,000 is going to be distributed.

All this time Belgium, which has 3,000 miles of railway, yielding a profit of 4¼ per cent., is only about one-third the size of Ireland, which has only 3,173 miles. In Belgium the

tariff for farm produce ranges from 5s. to 10s. per ton per 100 miles, while the rates in Holland for water carriage is still less.

The distances in Ireland between the different points at which the railway companies receive farm produce is much greater than in other countries, averaging 6 in Ireland, against 3 miles or less in the countries I have referred to, thus putting unnecessary extra carriage on the farmers in Ireland, which means an extra tax.\*

Therefore, the number of railway or roadside sidings should be largely increased throughout Ireland.

I think it is obvious to all that railway extensions and the perfecting of the railway system in Ireland is urgently required. There must at present be some 200 small fishery piers, nearly dry at low water, used by local fishermen using open boats, unconnected with the railway system, rendering it necessary to cart their fish long distances, which injures the value of the fish for market.

It is also of vital importance to provide a perfect railway system in Ireland, together with good steady sea boats for the safe and quick export of the large and ever-increasing live meat export trade, so as to keep up the proper condition of the animal until it is slaughtered, in this way saving the existing great loss in the condition and waste of the animal, while at the same time securing to the Irish farmer a higher price than if the same meat were to be exported as dead meat. This cannot be effected by the construction and use of steamers drawing only a few feet of water, and driven at high speed, in bad weather, as now sometimes happens, the cattle presenting a wretched appearance after a bad sea passage on reaching their market and fetching lower prices.

\* See Paper on Light Railways read before the Royal Dublin Society by James Dillon.

## INLAND NAVIGATION

Inland Navigation is a subject requiring the immediate and close attention of the Government and people of this country.

Outside the members of this Institution there are many not aware that some years ago we had an inland navigation of 750 miles, constructed and enlarged at a total cost of £5,000,000 of money, and that in recent years attempts have been made by the Government, not only to neglect its maintenance in some places but to partly destroy it, as I will presently show.\*

The Shannon navigation commences at the sea at Limerick and winds through the central plains of Ireland through the Shannon river, *via* Limerick, Killaloe, Banagher, Athlone, Lough Ree, Carrick-on-Shannon, and into Lough Allen, through the Ballinamore and Ballyconnell Navigation into Lough Erne, thence through the Ulster canal and through the Blackwater into Lough Neagh, and on through the Lagan navigation to the sea at Belfast, Dublin Harbour being connected with this great system of waterway by the Royal Canal navigation, 96 miles, *via* the Liffey, North Docks, Kilcock, Mullingar, and into the Shannon near Longford; also the Grand Canal and Barrow navigation, 207 miles, under the management of one company, *via* Port of Dublin, South Docks, Sallins, Monasterevan, Kildare, Tullamore, and Shannon Harbour into the Shannon river, with branches to Naas, Athy, Carlow, Bagnalstown, New Ross, and Waterford, &c.

Then there is the Lagan, Newry, Suir, Boyne, Bann, and Strabane navigations, 80 miles in length, their minimum depths varying from 4 feet 6 inches to 5 feet over sills.

There is no reason whatever why this splendid system of

\* See Report of the Committee on Board of Works (Ireland), 1878.

navigation should not only be properly maintained but enlarged and extended.

For some years past the railway companies situated in the canal districts have been doing their best to divert the traffic from the canals to the railways; this they have partly accomplished, so that the receipts from the inland navigation has been largely reduced, in some cases to a point below cost of maintenance.

The Board of Works, having charge of the greater part of this great system of navigation, are urged on the one hand by the Treasury, to try and get rid of the responsibility by leasing the navigation to local bodies, while the promoters of arterial drainage urge that the small traffic receipts from this river navigation does not justify the Government in unnecessarily adding to the cost of arterial drainage works, by keeping up the navigation water levels too near the surface of the flooded lands, and so, to a limited extent, interfering with the economical completion of arterial drainage works.\*

To allow any internal or intermediate section of their waterways to be neglected or abandoned would destroy and render impracticable all through traffic, which is the best paying water-carriage traffic, leaving practically nothing but short distance water carriage, which is found not to pay.

I must here point out the present neglected state of this inland navigation.

For years past considerable litigation has taken place with reference to the insufficient depth of water in the Royal Canal and its branches, from Dublin to the Shannon.

Since the Midland Great Western Railway acquired possession of the Royal Canal, the local traders along its route

\* See Agreements entered into by Board of Works (Ireland), and the correspondence as to the part sale of the Boyne Navigation and Ulster Canal.

complain that the maintenance of the works were neglected, resulting in tedious litigation, which has recently led to Government requiring the railway company to restore sufficient depth of water to admit of the proper working of the trading boats on same.\*

This neglect of the works during the last twenty-five years has led to the diversion of the principal traffic from the canal to the railway.

The Shannon navigation from Lough Allen to Lough Neagh has been destroyed, owing to not properly completing and maintaining the required depth of water in same, which has led to a serious diversion of traffic from the Ulster Canal; in fact, it is stated that the works on the waterway between Lough Allen and the Ulster Canal are neglected, if not abandoned.

The Lagan Navigation Company have now got possession of the Ulster Canal, and are working it as far as Monaghan, and half way to Clones.†

The Board of Works have inserted large sluices in the Shannon weirs above Limerick, giving them power (should they decide to exercise it) to lower the navigable depths on the Shannon in summer time, so as to lower the large lakes—Allen, Ree and Derg—to render them better able to check the summer and autumn Shannon floods below said lakes.

While the owners of the flooded lands along the Shannon have urged on the Government that the traffic receipts from the Shannon Navigation are not sufficient to justify the Shannon waters being kept to a height necessary for the navigation, but injurious to effectual arterial drainage in the Shannon valley.

\* See Board of Works Reports to Board of Trade and Treasury.

† See Board of Works Agreement with the Company now working the Ulster Canal.

Influenced, no doubt, by the one-sided evidence based on the above considerations, the Royal Commission on Irish Public Works suggested that the Shannon Navigation above Athlone should be done away with.\*

The adoption of this course would mean the abandonment of the largest and most central division of Ireland's inland navigation, between Athlone and Lough Neagh, in Ulster, destroying the Trunk lines, and only leaving the Branch lines of waterway, that not many years ago was completed at an expense of £5,000,000. I cannot help thinking it was a great error of judgment in coming to such a conclusion.

In support of this view I find the English people now regret they ever allowed so many of their canals to fall into the hands of railway companies, and they are now taking legal steps to correct their mistakes.

At present it would be impossible to estimate the enormous loss it would be to Ireland to neglect or abandon her inland navigation. Without it farmers would have to pay railway rates for heavy farm produce.

If from war, or other combinations, the price of English coal was again to reach thirty shillings per ton, a demand would at once spring up for thousands of tons of the excellent peat fuel adjoining this inland navigation, as happened when the price of coal reached famine prices some years ago; neither could the farmers ever after secure the advantages of cheap rates for corn, building materials, manures, flour, &c., as they now do wherever the navigable depths of water are preserved.

We are not, at the present time, without evidence on this point.

In the year 1886 and previously, the financial condition of

\* See First Report by the Royal Commission on Irish Public Works, 1887.

the Grand Canal was becoming worse year by year. About this time a new Board of Directors was formed. The net surplus revenue for the six months ending 30th June, 1886, amounted to £6,832, while the net surplus revenue for the six months ending June, 1896, amounts to £11,636 11s. 6d., equal to 4 per cent. on the ordinary capital of the company. This great change has been effected by substituting steam power for horses, by extending their system from Dublin to Waterford, *via* Carlow and New Ross, doing a large business in the carriage of corn, flour, building materials, porter, manures, coal, &c., over their canal and Shannon Navigation, and above all, by attending to the local wants of the traders.

It is therefore our duty as Irishmen to urge upon the Government the great necessity which exists for carefully preserving this valuable navigation to the country as well as its maintenance, restoring without delay that important link between Belfast Lough and the Shannon navigation, now that steam power has been successfully substituted for horse power. This steam haulage can be seen daily working on the Grand Canal and Shannon Navigation, now sought to be partly destroyed.\*

#### ARTERIAL DRAINAGE.

The subject of the arterial drainage of Ireland has from time to time engaged the serious attention of Parliament during the last century. The importance of the subject is chiefly due to the fact that the rainfall over the western part of Ireland is, as a rule, greater than over the remaining portions, while the central parts of Ireland are rather flat, particularly on each side of the Shannon river and valley.

\* See the Three Government Bills submitted to Parliament on the 2nd July, 1888, for the Drainage of the River Shannon, River Barrow, River Bann, and providing for the abandonment of portion of the Navigations.

What is meant by arterial drainage is the lowering and controlling of the river waters and their floods in their passage from the interior of a country to the sea, to permit of thorough land drainage, and to prevent the floods overflowing the adjoining river banks and country behind same, and to prevent the stoppage of the mills throughout the country from what is called "back water" rising on the mill wheels.

This is effected by deepening and enlarging the river channels and tributaries either by excavations or embankments, rebuilding of bridges with sufficient water way, reconstruction of mill weirs, mill wheels and sluices at lower levels. Such works are often of great magnitude and costly.

#### ACT OF 1842.

In Ireland very little progress was made with arterial drainage until 1842. In that year an Arterial Drainage Act was passed (5 & 6 Vic. c. 89).

This Act provided that the Government might carry out arterial drainage works, and, where necessary, drainage works in connection with navigation works, on the application of the owners of two-thirds in value of the land proposed to be drained.

Private funds were intended to bear the main cost of the works, leaving it open to the Government to provide the balance.

On the completion of the works the expense was to be apportioned on the lands drained according to the benefit conferred, the works and their maintenance to be handed over to local bodies of trustees, having power to tax the improved land for the annual maintenance of the works.

For some years very little use was made of this Act, until the Government found themselves confronted with the disastrous famine caused by the almost total failure of the

potato crop, the peoples' chief support, and when a vast number of people died from starvation in the mountain glens and along the public roads in their struggle to reach the poorhouse to secure some food.

Fresh Parliamentary powers were hurriedly obtained, giving the Drainage Commissioners power, with the consent of the landowners of but one-half in value of the land to be drained, to commence the works, limiting the expenditure to £3 per acre, to be paid by the proprietors, and should this prove insufficient the Government were to make good the required balance to complete the works.

In order to give help to a starving population, then exceeding 8,000,000, the designs for the works were hurriedly prepared. Government granted the loans, and the works were at once proceeded with in 121 river basins or districts, relieving about 267,000 acres from floods, at a cost of £1,880,000, assisted by private contributions amounting to £207,000. The remainder was by way of grant or loan by the State.

As in the case of most relief works, some, or indeed a considerable portion, of the money was not laid out to the best advantage, and as soon as the famine years passed away further arterial drainage works were stopped, and the accounts closed.

ACT 26 & 27 VIC., CAP. 88.

The drainage works, after the famine years, being practically closed, it was not until the year 1863 that the Arterial Drainage Act, 26 & 27 Vic., cap. 88, was sanctioned by Parliament. This Act relieved Government of the responsibility of executing any of the works leaving the initiation of the drainage scheme to landed proprietors, the Government assisting them with public loans, to be repaid back in 22 or 35 years, the latter number of years being allowed if works

proved costly in proportion to the value of the benefits conferred on the lands drained only under this Act.

Up to the end of last year there were 58 arterial drainage districts throughout Ireland, carried out by the landed proprietors, who employed their own engineers, contractors, and solicitors, the Board of Works advancing the loans as the works proceeded.

In this way 127,770 statute acres of land were relieved from flood at a cost of £955,540. Adding these figures to the figures representing the work done under the Drainage Act of 1842, we get the following result:—

	Total acres Drained	Total cost	Increased Value of Lands when Drained	Cost per acre Lands Drained
Drainage Works Executed under the Act of 1842 by the Government,	266,736	£ 2,390,612	£ 74,502	£ 8 18 6
Drainage Works Executed under the 1863 Act,	127,770	955,540	37,484	7 1 6
	394,506	3,346,152	111,986	

From this it will be seen that, under the Drainage Acts of 1842 and 1863, 394,506 acres have been increased in their annual value to the extent of £111,986 by being relieved from floods.\*

The works executed during the famine years under the Act of 1842 averaging about £8 18s. 6d. per acre, and the works under the Act of 1863, costing about £7 1s. 6d. per acre; price of labour during the progress of the latter works being nearly 100 per cent in excess of what was paid for the former labour during the famine years.

The proprietors under the Act of 1842 did not pay the £8 18s. 6d. per acre, but only an average of £6 17s. 1d., the balance being remitted by Government on account of the

\* See Board of Works Annual Reports for the years 1894-5-6.

interest on the Government loans exceeding the annual increased value of the lands benefited.

Under the Act of 1863 the whole of the £955,540 will be repaid to the Government by the proprietors, no tax being (under the Act of 1863) put on any portion of the catchment basin in which the works are situated, except on the parcels of land directly benefited by the removal of the floods. This limited taxable area has up to this been the established practice in Ireland, and it never has been the practice in Ireland to tax the whole water shed or catchment basin of a river for the draining of a fractional part of the same catchment basin.

With the exception of one or two small and unimportant districts there are now no new arterial drainage districts being carried out either by the Board of Works or the landed proprietors. In fact, owing to the great and vital changes in recent years brought about by all the recent Irish Land Acts, in the ownership of land and the improvements in same, the landed proprietors do not see their way to the promotion of new arterial drainage districts in Ireland, as they have been practically deprived of the legal power to carry out improvement works of any kind on their tenants' land, or charging their tenants with any portion of the cost of same, who hold under judicial rents, unless by consent, which is now seldom given.\*

To meet this great and new difficulty a short Act was passed in 1892, referred to as follows in the Board of Works Report (Ireland) for 1894-95, page 14, under heading "Arterial Drainage:"—

"The year was an important one in respect of this service, as it witnessed, in the case of the Carrigrohane (Co. Cork)

\* See Evidence given by James Dillon and others on Arterial Drainage before the Royal Commission on Irish Public Works, 1888.

scheme, the first inquiry into a proposal for the substitution of tenants for landlords under the Drainage and Improvement of Land (Ireland) Act of 1892, 55 & 56 Vict., c. 65."

It is obvious that the small tenants in Ireland have neither the necessary capital or education to form a drainage board, and to employ experts to carry out such works. The River Suck Drainage Board, when carrying out their works in 1889 had to get another Special Act in that year, making the occupiers of the land directly responsible to the Board of Works for the payment of an annuity in respect of each holding, not exceeding the estimated value of the improvement effected by the Drainage Board. In this case the tenants were to be charged with the repayment of £66,969, and the landlords with £70,884, there being 126 landlords and 1,900 tenants to deal with.

In the Board of Works Report for 1895-96 will be found (page 12) the following passage dealing with this subject:—

"The first half-yearly payment became due on 1st Nov., 1895, and in the usual procedure Receivable Orders were issued to each of the persons liable for payment.

"Up to 1st May, 1896, when a second half year became payable, the number of payments amounted only to £542, and the amount received to £2,147, against £3,101 receivable.

"In some cases omission to pay was due to a misapprehension of the liability, which was removed by explanation; but in most of the cases it is clear that there was a deliberate, and, in many cases, a combined attempt to evade the payment of the sum due.

"With a view to coping with this movement, we have received your Lordship's authority to employ a special procedure, and out of about 1,500 cases which have been recently placed in the hands of a special agent, certificates of actual proceedings have been furnished in 900 cases, and the sums

due have been recovered in 313 cases to date of this Report, 18th July, 1896."

Only one Provisional Order was granted by the Board of Works during the past year for a small drainage district.

From this outline of the present condition of the arterial drainage of Ireland down to last July, it will be seen that all the existing Arterial Drainage Acts for Ireland have become practically unworkable owing to the many changes brought about by Ireland's New Land Acts. This is greatly to be deplored, as no class of public works secures such a large proportion of the capital being directly paid to the local people for their unskilled labour for the improvement of their own lands, and thus circulating the money amongst the poorest class of the peasantry.

You will observe that the carrying out of the past arterial drainage has increased the taxable capacity of this country by £111,986 annually, increasing the volume of trade in proportion, and improving the climate, according to the views of a Royal Commission when speaking of arterial drainage.

There can be no doubt former Governments concurred in this view, because on the 10th May, 1883, Mr. Courtney and Mr. Herbert Gladstone submitted to Parliament their new Land Improvement and Arterial Drainage (Ireland) Bill consisting of 49 pages and 70 clauses.

This Bill seemed to have been prepared with great care, but it embraced many of the defects found to exist in the previous Acts, and Parliament rejected it. (See Appendix to Royal Commission Report, No. 1.)

Ireland being thus left without a workable arterial drainage Act, and there being no Government Department in Ireland with sufficient authority to carry out new arterial drainage works, Parliament subsequently admitted that, having regard to the low state of agricultural affairs, that a liberal

scheme for the carrying out of public works in Ireland might prove beneficial if proper financial aid was secured.

The whole of the United Kingdom rejoiced at this announcement, and great were the expectations raised in Ireland, as it was admitted that if it did not end in the mere signing of a Royal Commission Report, as sometimes happens, that a large well-considered, liberal scheme of useful and productive public works would confer incalculable benefits on the country. About this time a new Government came into power, and was in favour of such a proposal.

#### ROYAL COMMISSION ON IRISH PUBLIC WORKS (1886).

In the year 1886 the Government were so convinced of the backward and neglected state of Irish Public Works, that they felt it their duty to appoint a Royal Commission to inquire into the following subjects :—

1. To what extent the harbour accommodation on the coast of Ireland, either completed or in course of construction, meets the requirements of vessels suited for deep-sea fishing; and whether that industry can be promoted by the construction of new harbours, the improvement of existing natural or artificial shelter, the provision of better means of communication with markets, or in any other manner which may appear desirable?

2. What measures are required, with due regard to improvement or preservation of any necessary facilities for inland navigation, for the completion and maintenance of the system of arterial drainage in Ireland, especially in the districts of the Shannon, the Barrow, and the Bann?

3. Whether, in order to carry out any works that may be recommended for either of the above objects, it is necessary that the amounts which could be charged on the localities in return for the advantages derived from such works, should be

supplemented to any extent, and if so, in what manner, by the Imperial Exchequer?

4. Whether increased facilities could be afforded to trade and commerce by any changes, legislative or otherwise, in the organisation and management of the Irish railway system, or by an extension of the Acts for aiding the construction of tramways or other cheap means of communication with existing lines.

This Commission travelled around and through Ireland, and heard a vast mass of evidence in Dublin, Belfast, Cork, and elsewhere. Thirty Civil Engineers, many of them Members of this Institution, and about 100 other witnesses were examined from all parts of Ireland.

#### FIRST REPORT ON IRISH PUBLIC WORKS, 1887.

Their First Report was dated 9th April, 1887, and having dealt very fully with the past history of arterial drainage in Ireland, they reported in favour of relieving the Board of Works from the charge of arterial drainage, and to place it in charge of a Central Government Drainage Department.

To form about 30 Conservancy Boards for the whole of Ireland to act under the general instructions of the Central Department.

Each Conservancy Board to have charge of the entire catchment basin of one or more large rivers.

Sub-district Drainage Boards to be formed for the carrying out of the tributary river works where required.

The Central Drainage Department to be entrusted with the preparation of the general designs for the proposed new river works to be hereafter carried out by the Local Conservancy Board.

The whole of the catchment basin to be taxed for the cost of the works executed within the basin in proportion to the

benefits derived direct or otherwise, as they considered drainage would improve the climate generally (this would give the power to tax high, dry mountain land in one county for the drainage of a particular district of low, wet land in another county, provided both were in the same catchment basin contrary to the existing law of this country).

They proposed that Mr. Bateman's design for the improvement of the Shannon should be carried out at a probable cost of £265,000, provided the navigation above Athlone was to be abandoned, and that the landowners were to be taxed for a contribution of £70,000.

The owners of eel weirs to be taxed for £60,000, and the Government to give a free grant of £100,000, the balance of the £265,000 being already spent on certain new sluices inserted in the Shannon weirs.

They proposed the Barrow Drainage Works should be carried out at a cost of £400,000, to be charged on and paid for by the people living in the Barrow River catchment basin, with the exception of a Government contribution of £75,000, the people to pay for the annual maintenance of the works in the district, amounting to a considerable amount.

They proposed that the Lower Bann Drainage Works, which originally cost £264,000, of which £100,000 was a free grant, should now be improved at a cost of £75,000, less by £10,000 if the navigation was to be abandoned, the money to be provided as follows:—

By Government, a loan of £22,000 to be charged on the area now liable for the navigation charge, subject to a reduction of £12,000 should the navigation be abandoned.

£11,000 by the lands now contributing to the drainage.

£22,000 by the Catchment Basin.

£20,000 by a Government Free Grant.

THE SECOND REPORT OF THE ROYAL COMMISSION ON  
IRISH PUBLIC WORKS.

Their Second Report was dated and published on the 4th January, 1888. It deals with the question of deep sea fisheries, want of proper decked fishing boats, want of deep water harbours, want of means of transport between the fishing grounds and harbour and the markets for such fish.

The want of railway communication for the proper development of the fishing trade.

It indicates some 30 different sites for useful deep water harbours, and other works around the Irish coast.

It suggests a free grant of £400,000 for the above purposes, to be spread over ten years, or £40,000 per annum.

Then as regards

RAILWAY EXTENSION,

it cautions the Government against sanctioning a break of gauge, refers to the construction of 162 miles of light railways at a cost of £676,000, averaging from £4,000 to £5,000 per mile. Points out there were only 109 miles of narrow gauge railways in Ireland before the Tramways Act of 1883, and recommends that assistance by Government grants should be given to the following proposed railways, if possible on the standard gauge of the country—5 ft. 3 in. :—

- 1—Railway from Downpatrick to Ardglass.
- 2— Do. Molroy Bay and Sheep Haven (not carried out).
- 3— Do. Alternative Route to Killybegs (narrow gauge, not carried out).
- 4— Do. Ballina and Belmullet (not carried out).
- 5— Do. Galway and Clifden.

- 6—Railway from Tralee and Dingle (narrow gauge).  
 7— Do. Killorglin and Valencia.  
 8— Do. Skibbereen and Baltimore.  
 9— Do. Kinsale Harbour Branch.  
 10— Do. Short Branches at Bantry and Dun-  
 garvan.

They Report against State purchase of Irish railways, suggesting the formation of an Irish Railway Commission, and a scheme for amalgamation and construction of extensions.

Their railway financial proposals for new railways were as follows:—

Government to guarantee to those who constructed any approved line 3 per cent. on the capital, as it was paid up and certified by the Government Engineer to have been properly required, at cash prices, for the construction of the line; and, in addition, a proviso for rolling stock and working capital, when required, not exceeding one-third of the cost of construction.

The district to guarantee to the same parties, in addition, the equivalent of a rate of sixpence in the pound on the rateable value, together with proposals as to the repayment of this last-named sixpence should receipts exceed working expenses, &c., &c.

The Government did not see their way to the carrying out of this financial proposal.

#### GOVERNMENT DRAINAGE BILLS IN 1888.

The Government, on the 2nd July, 1888, submitted to Parliament three new Bills for dealing with the immediate drainage of the

Shannon river at an estimated cost of	£230,000
Barrow river	360,000
Bann river	65,000

## SHANNON RIVER.

The Shannon river works were to be carried out by the Board of Works only.

It provided for the abandonment of the navigation on so much of the River Shannon and its tributaries, and the lakes on its course, as lie above the town of Athlone, and the regulation and varying of the depth of water above Athlone.

The £230,000 was to be raised as follows:—

Parliament was to have given a free grant of £65,000, a loan of £35,000 was to be charged upon the lands specially benefited, and the balance was to be secured upon the receipts of the Shannon Navigation not abandoned, and upon the County Cess.

## BARROW RIVER.

In the Barrow Drainage Bill, 1888, submitted to Parliament at the same time, clause 2 provided that the following persons shall be constituted a Commission for the purposes of this Act, that is to say—Sir James Joseph Allport, Knight; James Abernethy, and John Wolfe Barry, Esquires, Civil Engineers; and Joseph Todhunter Pim, Esquire.

The Commission shall be styled the Barrow Commission and shall be a body corporate, having perpetual succession and a common seal, with power to acquire and hold land for the purpose of this Act, &c.

The Commission was to prepare a scheme, at an estimated cost of about £354,254, charging a sum of £175,000, being a portion of the estimated cost of the proposed works, upon lands for the special benefit of which the proposed works were designed, charging a sum of £20,000 upon the county cess of those baronies and townlands which are situated within the catchment, the term "land" to include houses.

The Commission to employ such engineers, officers, and

clerks as may be necessary, and the Commissioners of Public Works were from time to time to advance to the Commission, out of moneys to be voted by Parliament, such sums as the Treasury may sanction, to the extent of about £159,000. The Bill extends to 23 pages, and contains 41 clauses.

#### LOWER BANN RIVER.

The Bann Drainage Bill, 1888. In this Bill clause 2 is an exact copy of the clause 2 in the Barrow Drainage Bill above referred to, the names of the gentlemen to constitute the Commission being the same in both Bills. They were to prepare a scheme charging a sum of £8,000, being a portion of the estimated cost of the proposed works, upon lands for the special benefit of which the proposed works were designed, and to charge a sum of £37,000 upon the county cess of those baronies and townlands which are situated within the catchment area.

The Commission, with the consent of the Treasury, to employ an engineer, and such officers and clerks as may be necessary.

The Commissioners of Public Works to advance, out of moneys to be voted by Parliament, such sums as the Treasury may sanction, to the extent of about £20,000.

The Bill extends to 21 pages, and contains 39 clauses, and provides for the abandonment of the navigation of the Lower Bann.

Each time the Government submitted their three Bills for the arterial drainage of the rivers Shannon, Barrow, and Lower Bann to Parliament, the opposition against them became stronger and more determined, and finally the Government had to withdraw the three Bills because of the very objectionable provisions they contained; and I find it difficult to understand why they were inserted, as many of the Civil Engineers and

others of large experience in Ireland, who gave their evidence before the Royal Commission clearly, and in the most conclusive manner, pointed out how such provisions would kill any scheme for the completion of the arterial drainage of Ireland, and those who have read the evidence on arterial drainage given by the Members of this Institution and others before the Royal Commission on Irish Public Works in 1887 and 1888, are, no doubt, aware that I disclosed many facts in support of such evidence that I fear would extend this Address to too great a length were I now to refer to them in detail ; however, the printed evidence can be had in the Public Libraries dealing with arterial drainage, railways, &c. (see Appendix to Reports Nos. 1 and 2 of the Royal Commission on Irish Public Work, also to a paper read by me before the London Society of Arts on this subject.)

#### PUBLIC WORKS NOW (1896) IN PROGRESS UNDER GOVERNMENT DEPARTMENTS.

On referring to the Report of the Commissioners of Public Works for 1895-96, it will be found that, with the exception of the usual annual maintenance of the limited existing public works, this entails a large amount of difficult and costly work, requiring a large staff to superintend it, and a few new architectural buildings, and the timber pier at Killybegs, there seems to be no provision made for at present carrying out any new engineering works such as harbours, inland navigation, or any considerable new arterial drainage work, unless there may be one or two small drainage schemes in the whole of Ireland, carried out by a local Board.

On referring to the fourth report of the Congested Districts Board for Ireland for 1894-95, page 4, the following will be found :—

“The time has arrived, as was represented to the Irish

Government last year, when this income is no longer adequate to such demands made upon it as the Board would think it right to accede to if a larger income were at its disposal.

“The construction of many desirable fishery piers and boat slips has to stand over, the giving of financial assistance to local land drainage projects is impossible except on a very small scale, and it is quite beyond the powers of the Board to take action for the enlargement of small holdings except in a few instances for experimental purposes.”

I find in the same report under the heading “Official Staff of the Congested Districts Board,” the following passage occurs :—

“The question still remains in an unsatisfactory and unsettled state as to whether it rests with the Treasury to pay out of moneys provided by Parliament the salaries and remuneration of the Boards’ Officers and the administrative expenses of the Board.”

This Board has already rendered valuable services to this country, and is undoubtedly entitled to a sufficient annual grant for its numerous small works and undertakings, completed or in progress.

On referring to the Report of the Inspectors of Irish Fisheries for 1895, page 18, and under the heading “Piers and Harbours,” the following passage occurs :—

“In our Report for 1894, we gave a return relating to works under the Sea Fisheries (Ireland) Act, 1883 (46 & 47 Vict., c. 26) up to the 31st March, 1895. In 1895–96 a further sum of £359 2s. 9d. was expended on Greystones Harbour, County Wicklow, making the total cost of that work £21,385 15s. 7d.” Why should not Government give this useful Board sufficient annual grants to carry out larger and more useful deep-water harbours than those already constructed, or amalgamate it with a larger Board?

From the above quotations from the three official reports, it would appear that, with the exception of maintenance works throughout the country and the Killybegs Timber Pier, £359 was all that was spent on new Fisheries' Piers last year, and that no new deep water harbours are now being started or in progress, as none are referred to as new works in the above reports.

The Government being unable to get Parliament to sanction the proposals made by the Royal Commission on Irish Public Works from 1887 to 1889, decided in the latter year that at least certain branch railways should be made.

Owing to the great energy of Mr. Arthur Balfour and his Government, the Light Railways (Ireland) Act, 1889, was passed by Parliament.

By this Act he was enabled to enter into agreements with existing railway companies to construct certain branch Railways, and to work them on certain conditions, and as the financial proposals made by the Royal Commission was found to be practically unworkable, Mr. Balfour, owing to his great personal influence, got his Government and Parliament to give a free grant for the construction of the following branch railways:—

No.		Miles
1	Donegal and Killybegs ...	18 $\frac{3}{4}$
2	Stranolar and Glenties ...	24 $\frac{1}{2}$
3	Ballina and Killala ...	8
4	Westport and Mallaranny ...	18
5	Achill Extension ...	8 $\frac{1}{4}$
6	Collooney and Claremorris ...	47
7	Galway and Clifden ...	48 $\frac{1}{4}$
8	Killorglin and Valentia ...	26 $\frac{3}{4}$
9	Headford and Kenmare ...	19 $\frac{3}{4}$
10	Baltimore and Skibbereen ...	7 $\frac{3}{4}$

No.		Miles.
11	Bantry Extension ... ..	1 $\frac{3}{4}$
12	Downpatrick and Ardglass ...	8

All on the broad gauge except the first and last in above list.

For this public act the Government and Mr. Arthur Balfour have received the unanimous thanks of the country. First for the enormous benefits conferred on the Western districts through which the lines are made, and secondly, for adopting the standard railway gauge of the country, the object being to reduce the railway goods rates to the lowest point, which could not be done with a break of gauge.

I have no doubt the present Chief Secretary for Ireland will, if possible, surpass his predecessor in trying to confer further benefits on Ireland, because under the Railways Act (Ireland), 1896, a further grant of £500,000 has been sanctioned, and I trust its application (when made public) will prove equally successful, and that he will also avoid break of gauge between the interior of the country and Ireland's sea-ports when possible.

These gentlemen, admittedly possessing great power and business capacity, backed by their Government, must be well aware that the few branch railways they have already made, and the further expenditure of another £500,000—about the cost of only 100 miles of railway at £5,000 per mile—is wholly insufficient to meet the present wants of the country, as there are many parts of Ireland where there are 100 square miles of country without the necessary railway accommodation, and other parts of Ireland where goods have to be carted from one railway terminus to another, as is now the case in the cities of Belfast, Waterford, Cork, and other places.

It would thus appear that the labours of the Royal Commission on Irish Public Works, whose Reports were published

as far back as 1887-88 (a period of nearly 9 years), were not followed by any great results, as there are as yet—

No new deep-water harbours in progress,

No new branch railways in progress (except the few referred to),

No new arterial drainage works,

While Ireland's inland navigation system of over 750 miles has not yet been quite destroyed, the proposal of the Royal Commission and Government to abandon the central portions of it not having yet been carried out, but may at any time if steps are not now taken to prevent it.

It is very generally known throughout the country some of the principal causes that contributed towards preventing the Government from carrying out the proposals made by the Royal Commission on Irish Public Works, and that are apparent on comparing their proposals with the evidence given before them by men living in Ireland, possessing experience and judgment and great technical knowledge on all questions relating to harbours, railways, and arterial drainages, some of whom were members of this Institution, but who were not invited to act on the Royal Commission, there being only one representative from the whole of Ireland (and who was not an engineer) appointed to act on the Commission. The four gentlemen constituting the Commission were admittedly men of great ability and standing, and the Government, no doubt, believed they were doing the right thing in so constituting the Royal Commission.

Yet what would be said if the people of England unanimously asked for the appointment of a Royal Commission to Report upon English Public Works, and that the Government, when constituting the Commission, only put one gentleman on it to represent all English interests, the rest of the Commission consisting of two or more engineers from Ireland and another expert, and that the Commission so constituted only

selected railway assistant engineers, and a hydraulic engineer and his assistant engineers from Ireland, to assist them in maturing designs based on the evidence tendered to them by English engineers and others, and that said Commission were subsequently nominated as Commissioners to carry out their own proposals, and that Parliament rejected the recommendations of a Commission so constituted.

The answer to this query I will leave to you and others to supply, and to deal with as you think right hereafter.

I deeply regret to record as your President that this was precisely the way Ireland was treated when names were being selected to constitute the Royal Commission on Irish Public Works, as an inspection of the evidence, reports, and proceedings of the Royal Commission on Irish Public Works will prove. Nay, more; when some of the members representing Ireland in the House of Commons complained that an Irish engineer of experience was not appointed by the Royal Commission to complete the designs for works specially applicable to Ireland—engineers in Ireland having a more practical knowledge of the requirements of such than any engineer living in England—the only information forthcoming on the subject was that the English gentleman who was appointed as hydraulic engineer had relations in Ireland (the degree of relationship was omitted).\*

Here I must stop, this being a non-political Institution; but I had hoped that the time had long since passed to slight a country in such a way; and sincerely do I trust as your President that those who fill this chair after me will never have to speak on this subject again on behalf of the engineers of Ireland.

It is earnestly to be hoped that further time will not be lost by the appointment of another Royal Commission, which would practically mean the loss of two, three, or more years as in the last case, but that Government will endeavour, if

\* See "Hansard" and the Dublin Newspapers.

possible, to organise a strong central department in Ireland, possessing the confidence of Ireland and Parliament, placed in command of annual grants, but to be accountable for the proper expenditure of same to Parliament for the completion of Ireland's public works.

All productive works under each of the above headings to be first taken in hand, so as to give time for the further consideration of works that might not prove productive until some time after their completion, although important as regards the general improvement of the country.

#### PRIVATE BILL LEGISLATION.

Few persons are aware of the enormous sums of money lost to Ireland owing to the present unsatisfactory state of Private Bill Legislation.

As the law at present stands, no legal sanction or compulsory power can be had to acquire land for any considerable new works without applying to Parliament for same, and if the application is opposed by any interest, a large expenditure has to be incurred on Parliamentary agents and counsel, and expert evidence and witnesses.

Even in the case of a Provisional Order for a small drainage or waterwork, and when the time required for the compulsory purchase of land has exceeded the usual limits allowed, and although Government in the first instance gets the Provisional Order confirmed by Act of Parliament, free of expense to the promoters, with the exception of the cost of the Provisional Order, yet the promoters of the work, if the compulsory powers had expired before completion of work, would have to obtain a new Act of Parliament for additional time for compulsory powers, at a cost of £500 or more, employing their own Parliamentary agents and solicitors.

The relaxation in the observance of some of the standing orders of Parliament, and the number of exceptions now

sanctioned in connection with these standing orders, almost amounts to a public scandal, while the cost of the Private Bill Legislation is daily becoming greater.

In England the cost of obtaining certain Private Bills have in some cases exceeded £50,000, and sometimes more; and in Ireland in some cases exceeding £10,000.

In recent years a practice has sprung up of introducing new matter into Bills after the Bills have been considered by the Lords' and Commons' Committees, sometimes resulting in the rejection of the Bill by Parliament, after great expense has been incurred by both promoters and opponents.

In other cases promoters, when proceeding to carry out their work, after obtaining their Act, fail to carry out their work within the Parliamentary limits of deviation marked on their Parliamentary plans; cases of this kind have occurred both in England and Ireland, resulting in litigation and great waste of money.

I could refer to many other defects, but I have said enough to show that the present system is defective and too costly, and that Ireland is urgently in need of a good workable and inexpensive scheme for dealing with Private Bill Legislation, and without which many useful works could not now be carried out, on account of the uncertainty and cost of the Private Bill procedure.

Reducing the cost of Private Bill procedure would enable municipal and other bodies to start many large and useful works, such as sewage, works much required, electrical railway, electric lighting works, &c., &c., which, added to the public works enumerated by me, and so urgently required, would give much employment to the people throughout the country, and also to a very large number of highly-trained and qualified engineers, as is now the case in England.

#### ENGINEERING SCHOOLS.

In order to keep up a supply of engineers required at home and in our colonies to fill the gaps caused by promotion,

retirement, sickness, &c., thousands of educated young men are now receiving scientific training in civil and mechanical engineering in the various engineering schools and laboratories attached to the Universities of Oxford and Cambridge, University College, London; King's College, London; Owens College, Manchester; and some twenty-five or more somewhat similar institutions throughout England, in addition to all their splendid mechanical workshops.

Continental Governments, observing this preparation, have provided similar instruction of a very complete and comprehensive kind.

I regret to say our Government has practically done nothing for Ireland in this direction. It has charge of the Engineering Schools attached to the Queen's Colleges in Cork, Galway, Belfast, and the Royal College of Science, Ireland, presided over by men of great ability.

It is five years since a Professor of Engineering was appointed to last-named institution; still all these institutions, and the whole of Ireland, are left by the Government without the necessary mechanical appliances, testing machines, and workshops, similar to what Owens College in Manchester has, to enable students to be properly qualified for modern mechanical engineering and civil engineering, now that large steel and cement structures are being substituted for those formerly built of brick, iron, or stone, in all parts of the world requiring scientific and practical treatment.

It is true our Engineering School in Trinity College (our Dublin University) is admitted to be one of the best civil engineering school in the Kingdom. Its professors are known throughout the world as men of great ability, while the intellectual capacity of her students are quite equal to the best in other countries. But we ask that all our engineering schools provided by Government should in no way be inferior to Owens College, Manchester, above referred to, so as to place engineers in Ireland in as good a position as those in

other countries as regards their scientific and practical training.

Young men living in Ireland requiring this training have now to incur the great expense of residing in England for 3 years, and also the payment of some £300 or more of fees before being taken into the workshops, in addition to their collegiate education, the whole requiring from 6 to 7 years. Government could reduce this great expense by providing colleges somewhat on the lines of Owens College, Manchester.

I have indicated to you how, by the construction of well-conceived public works, great benefits have been secured to the farmers in foreign countries, enabling them to successfully compete against the Irish farmer.

I have pointed out to you that in Ireland we have not yet secured some of the public works so urgently required, such as Deep Water Harbours, Inland Navigation, Arterial Drainage, Branch Railways and Junctions, and other works (the existing mileage between the Railway Stations in Ireland being, as already stated, in many cases 100 per cent. greater than in the countries already referred to by me).

Our Board of Public Works is rendered powerless to meet the wants of the country through the action of Parliament and the London Treasury in withholding the required financial aid, the Treasury considering they have done their duty in looking after the maintenance of Government buildings, a few harbours, &c., and the repayment of some outstanding loans due to them.

The adoption of this policy by the Treasury has practically resulted in the stopping of all new public works in Ireland—in fact, enough money could not be obtained from the Treasury even to build one small wooden pier in Ireland this year, until the Congested Districts Board came forward with a contribution to make good the deficiency of the Treasury grant, both contributions, in the whole, amounting, it is thought, to only £10,000. I refer to the Killybegs Timber Pier.

At a public meeting held at Howth some days ago it was announced that the Treasury refused to supply the necessary funds to only dredge the Howth Royal Harbour to a sufficient depth to allow fishing boats to seek shelter in it with safety.

A continuance of this policy must prove most injurious to the interests of this country. It is therefore to be hoped that whenever the Government decide to create a new Government Department for Ireland, it will not be placed under the control of the Treasury that has contributed to the present backward state of her public works.

If it is true that Ireland has been overtaxed by England, I feel sure that Parliament will make good the mistake by providing liberally for the completion of Ireland's public works, so urgently required to enable her people to compete successfully in all English markets with the foreign produce.

I think it is the duty of the Engineers in Ireland, and of this Institution, to bring the requirements of our country before the notice of those in power, understanding as we do the nature of the works and all matters relating to, or arising out of, their execution, most suitable to meet the wants of the people.

Again thanking you for having selected me to be your President, the highest honour your Institution can confer on one of its members.

I must conclude by apologising for taxing your patience, but I was anxious to let this Institution and the country know the "Public Works that Ireland Needs."

MR. W. H. MILLS (Past-President) proposed a vote of thanks to the President for the very able Address which he had delivered to them that evening. It was full of interest and instruction, and contained facts and figures which would be most valuable for future reference. It also alluded to many points which would form suggestions for several interesting papers for the Institution.

It was only those who had prepared a Presidential Address

for delivery before the Members of this Institution who could thoroughly realise the amount of care and anxiety which was involved in the preparation of such an Address as they had heard to-night.

Much attention and time had to be devoted to the selection and treatment of subjects to be described, time which had to be taken either from the hours of the daily avocation or those set apart for recreation. The particulars brought forward must be very carefully considered, and be thoroughly correct in every way, to be of any service for reference.

In preparing these addresses, there are always a great variety of subjects which might be treated, but at the same time the President feels that he must restrict himself to those which will be of value and practical interest to the members of this Institution.

He had great pleasure in proposing a vote of thanks to the President, and also in proposing that the Address be recorded and printed in the "Transactions" of the Institution.

MR. E. GLOVER said it afforded him much pleasure to second the vote of thanks to the President. The Address contained much information and, when printed, should be valuable. It gives a bird's-eye view of Commissions and their results for the past half century or more, and thus should be valuable in indicating the direction of future effort. They had Commissions on all things now—they were in the air—so that the Address this evening is certainly up-to-date in spite of its dealing with the past so largely. He thought the President indicated many things that would be useful for the "Recess Committee" to ponder over. At this late hour he should cut his remarks short, and would therefore content himself by seconding the vote of thanks which he was sure would be carried *nem. con.*

Houses of the Oireachtas