

Extracts from

“A Preliminary Report on the Re-afforestation etc. of Ireland by W. Howitz, Forest Conservator.”

By M. McNAMARA

Daniel Christian Bonaventura Howitz, the son of a land agent, was born in Denmark on the 2nd May, 1841. He graduated in forestry in 1865. Three years later he emigrated to Australia and there entered the Government service. He held posts described as Forest Conservator and Superintendent of the Forests. He was also Danish Vice-Consul in Melbourne. He left Australia in 1881 and went to Algeria where for a year he was engaged in Forestry work for the French Government. From 1883 to 1887 he lived in Great Britain where he did advisory work. He returned to Denmark in 1887 and there until 1893 he was engaged in anthropological studies. He died in New York in 1893.

In 1883 Dr. Howitz paid two visits to Ireland to study the forestry potential of the country for the Gladstone Government. His first visit was of two months duration, and on his second visit he stayed for one month. His conclusions might be summarised as follows:—

1. That approximately 5,000,000 acres of Ireland was more suitable for forestry than for any other land use.
2. That 3,000,000 acres should be planted in the counties facing the Atlantic where a high percentage of the land was too poor for agricultural purposes and where the remaining farm land would benefit from the shelter provided by the forest. There also manpower was available and in urgent need of employment.
3. That a further 1,000,000 acres should be planted in the catchment basins of the country's main rivers to control run off and prevent periodic flooding of the fertile river valleys.
4. That the annual planting target should be 100,000 acres.

Howitz presented his recommendations to the Government in a report entitled “A Preliminary report on the Re-afforestation etc. of Ireland.” Subsequently on the 15th June, 1885 and again on the 14th August of the same year he appeared before the Select Committee on Industries (Ireland) under the chairmanship of Sir Eardley Wilmot and elaborated on his report. The members of the committee discussed details of tree species and suitability of various types of land for forestry, but questions on the technical and administrative problems involved were lacking. So too were references to the capital require-

ments of the scheme and the re-settlement of tenants whose lands were to be afforested. It may well be that in this period of rapid industrial expansion and Imperial wealth the problem did not appear as staggering as it would to-day.

The following quotations should prove interesting and controversial to the foresters of to-day.

"Of the 20 million acres of Ireland about $\frac{1}{4}$ is well suited for forest cultivation. All the ranges and bogs, all the barren and desolate coastlands, and a great many of the very poor grasslands are natural forest and should be made such. Many hundreds of thousands of acres do not pay an interest of 6 pence a year, and the greatest part of the 5 million of acres are waste ground and pay not a penny. There is much grassland and many fenced paddocks on the range where the heather and bracken is in such force and where rocks and stones etc. cover the ground to such an extent that the actual gain per acre is not more than 1/- to 2/-. Would it not be better to cultivate these vast areas, so eminently suited for forests, and to obtain a yearly return of at least one pound per acre instead? The calculation is easily made, and without entering upon details, which would be out of place here.

Cultivation, including cost of nurseries, purchase of seeds, purchase of ground, purchase of tools and buildings, fencing labour and superintendence, should for say 100,000 acres, be about £4 per acre or £400,000.

This first cost calculated with 4% interest for 30 years, £17 per acre. Add to this expense for superintendence, road making and repairing, maintenance of fences and drains as well as all incidental expenses made up as follows

First cost after 30 years	£1,700,000
1 Superintendent @ £500 a year; 50 forest rangers				
@ £50 to £75 a year; Repairs to buildings, tools etc.				£125,000
Road making and repairing fences, drains and incidental expenses	£35,000
				<hr/>
				£1,860,000

and to put expenses with a round sum to 2 million pounds the cost per acre will be at 30 years of age £20, this allowing for the highest wages, and I firmly believe that the expenses will be 25% less.

A pine forest at that age, under present conditions of soil and climate and at the ruling market prices, which are bound to rise considerably in 30 years, be worth at least £50 per acre all round. I have here not allowed for the small wood obtained by thinning cut the growing forest, nor for any by-products obtained during the 30 years, and still the return should be worth £1 per acre per annum.

Some of the Scotch foresters agree with me that £1 per acre is not too high; nor when we consider that in Ireland can be grown far more valuable timber trees than in Scotland or England, and that opportunities for transport are so many and so easy there, I arrive at the conclusion that the result may be more than doubled.

There is no great difficulty in cultivation in any part of Ireland as far as I have been able to see, not even in the storm blown ranges of the West coast. The winds will there undoubtedly, keep the forest down for a long while, and the outer belt will be of no great value for utilization, but by and by the forest will gain the mastery, and if the protection of the outer belt is kept permanent and intact, inside this the now barren hills will in less than half a century have become fertile rich meadows, and highly productive cereal fields. The question of the re-forestation of Ireland must therefore, to every experienced man appear a question of life and death to the country, and with the facilities as yet in existence, but which, by exposure to the climatic and other influences, may change and disappear, with the consideration that by clothing the hills and ranges the disasters from floods and droughts may be avoided and last but by not least, the consideration that "it will pay", I consider it of the very greatest importance to commence the work as soon as possible. Every year wasted is a great loss, for with every year the soil loses some of its present suitability and with every year the complications and difficulties for extended cultivation grow apace, time is lost and money. By re-forestation of Ireland, at present fast depreciating in value and fertility with every year, the whole country will be made fertile, prosperous and in consequence therefore peaceful.

A rough estimate gives about 3,000,000 acres as the area which should be cultivated fast and mainly distributed in the North, West, and South-West in a three fourths circle of the form of a C while the great river basins of the Shannon, Lough Neagh, Blackwater, Barrow and numbers of less significant basins, would require perhaps another million or more for purposes to regulate the flow of water. As the treatment of these basins should be very similar, I have taken only one in hand viz. the Lough Neagh basin, the second in importance and size, and having of late years attracted so much attention by skilled engineering works executed there to prevent the destruction by sudden flooding of the low lands, works which I feel convinced of will never be able to prevent disaster or fully deal with the flood waters. No engineering works will ever be able to do it. The real cause, the denudation of the slopes and ranges of the whole catchment basin must be removed before any real good can be done, as experience shows at the Rhone in France, and other rivers where expensive engineering works have utterly failed in stemming the mountain torrents, or preventing them from flooding the valleys and low lands to the destruction of these. There the cultivation of the great slopes and catchments, basins, ranges and high

mountains, is being carried out, a forest work is very difficult, costly, and executed under very harrassing circumstances of extremes of heat and cold, sudden rains and long droughts, and great want of earth to plant in. These places have been so long denuded of trees and shrubs that the rain has washed every vestige of fertile earth away leaving only a small quantity in crevices, and on the narrow ledges, an experience which should be avoided in Ireland, but which is sure to take place in time if the work of cultivation does not take place before very long.

The difficulties in these countries, both the physical and climatic, are so enormous in comparison to those to be met with in Ireland, where the island clime the proximity of the great ocean current the Gulf stream and the abundance of mould or humus to plant in, as well as the geological formation are all so favourable to forests, that it would be unwise to delay the works till some of these advantageous features shall have disappeared.

Considering the large area to be cultivated and all the various social and political problems out of my province to deal with, I would therefore recommend that only the Lough Neagh catchment should be cultivated first with about 100,000 acres, the whole of which should be treated as one district and subjected to one plan, and under the direction of a head forester—a trained theoretical and practical professional forester—who should have the sole charge of the cultivation.

But, at the same time, as the work of covering the denuded hills of this basin, as well as the great part of the Mourne Mountains, with forest, plans for the cultivation of the Shannon and other basins should be prepared and also a number of trial plantations, be commenced in the more difficult highland and coast areas of Donegal, Leitrim, Sligo, Mayo, Galway, Clare and Kerry. These trial or experimental plantations should be formed by making a number of small and cheap nurseries easy of approach but as close to the future plantations as possible, and representing in soil and position, as much as it can be done practically, the whole of the cultivation. For the great bulk of the cultivation flying nurseries will have to be made. Thereby the long and costly transport of plants is avoided, these are not exposed so long with their base roots, to the influence of the sun and the air, and the cultivator can choose his own time for planting, a circumstance of great importance here, where the climate changes so rapidly from cool to warm, and sudden rains may aid or prevent the work, lastly the plants are reared in the same soil and under the same conditions as those which they are to occupy in future. Large and in consequence, costly nurseries must be avoided in all great cultivations and where as in Ireland it will be so cheap and comparatively easy to fence in small plots on the hillside in the centre of the future plantations, it would be a great mistake to act otherwise.

While commencing at the North of Ireland I would therefore recommend that such experimental nurseries or plantations should be erected near the following localities namely:

Garvagh	}	in the County of Londonderry
Buncrana	}	Donegal
Barracktown		
Glenties		
Kiltyclogher	}	Leitrim
Collaneg	}	Sligo
Leaville		
Bangor	}	Mayo
Newport		
on Croagh Patrick		
on the Slieve Partry Mountains		
Clifden	}	Galway
Cahir		
on the Slieve Broughton Mountains		
Boston	}	Clare
Fairy Hill		
Kilrush		
Ardagh	}	Kerry
on the Stack Mountains		
Dingle		
on the Inveragh Mountains		
on the Slieve Miskish Mountains	}	Cork
Kilmeen		
Cahirflaggan		
on Knockmealdown Mountains		

If 3,000,000 acres should be cultivated, about 100,000 acres a year should be planted requiring between 3 and 4 hundred millions of plants yearly, and about one third could be reared in these nurseries, the rest being raised in flying nurseries. The more valuable timber trees of Western North America should be experimented with here, and there might also be reared a number of ornamental trees for distribution in the country to schools, public institutions as well as to the population.

If it should now be decided to cultivate the whole available forest land of Ireland, and to commence at once, these nurseries, together with the flying nurseries furnish 3 or 4 hundred millions of plants

yearly, and about 100,000 acres being cultivated yearly, it would be 30 years before the whole of the 3 millions of acres were cultivated; but before that time much valuable experience would have been gained, and the value of the work an established fact, while the country had got confidence in the question, and the first planted forests commenced to yield a steady increasing supply for local wants as well as for the requirements of the great markets of England.

The first thing to be done should, therefore, after my humble opinion, should be to nominate a committee of forestry, with a professional experienced forester as secretary, to examine into the requirements of each special locality, while fixing the place for each nursery and the area to be cultivated. The forest laws should then be framed for the protection of the forest, and with the experience from France and Switzerland, these would not be a great matter of difficulty to men who understood the Irish people. There should then be a central forest department in Dublin, under the guidance of some professional forester, and the work on the Leough Neagh be proceeded with as quickly as possible, firstly to prevent the floods there; secondly to gain experience, and thirdly, to gain confidence in the efficiency of the work, without which the rest of the cultivation would be difficult. The 20th Clause of the Tramways Act, 1883, provides that: The planting of trees should be included amongst the purposes for which money may be advanced by the Board of Works. This I consider a great advantage and one which may be useful here. It enables private people to cultivate forests on their less valuable land, but at the same time I consider it necessary that, the people who wish to do so, act in unison, and follow a proper plan under the guidance of efficient leadership, and this cannot be done otherwise than by placing such work under the supervision of properly trained foresters and a central forest department."

Dealing with the question of an outlet for surplus timber Howitz wrote "As England now is the greatest consumer of timber and wood in Europe it is evident that the proximity of the greatest market must raise the value of the product in the forest of Ireland. According to the Swedish "Tideskrift for Skogshushalning 1881 Upsala" the consumption of wood for the years 1872-1878 gave the mean importation as follows:

England	imported yearly	290,000,000 c. ft.
France	" "	70,000,000 c. ft.
Germany	" "	40,000,000 c. ft.
U.S. of America	" "	25,000,000 c. ft.
Holland	" "	20,000,000 c. ft.
Belgium	" "	18,000,000 c. ft.
Denmark	" "	14,000,000 c. ft.
Spain	" "	12,000,000 c. ft.
Australia	" "	5,000,000 c. ft.

The importation to England consists of 36% of timber for buildings and of larger dimensions, 55% of split and sawn timber, 5% of coopers' wood and 4% of exotic timber for furniture and articles of luxury.

The greatly increased demand for telegraph poles, sleepers, pit props etc. mainly supplied by the pine forest for the growing of which Ireland in particular seems extraordinarily well suited points directly to which kind of trees to choose. While therefore the great bulk of the forests of Ireland should be grown with pines and other conifers, in the sheltered lowlands, along the watercourses and near the sea, a great number of valuable deciduous trees might be grown as well as on the firelines which must divide the forest and prevent any large conflagration although, in such a humid climate as that of Ireland, this danger is less imminent than in the more southern and warmer climates.

Application of Forestry to the remedy of the Torrents and Floods
of the Catchment Basin of Lough Neagh

IN visiting the locality, I noticed first that a great deal of the land and the surrounding hills had of late years been formed into grasslands. The heather, brake and shrubs, which before covered these slopes, and these formed nearly the only vegetation, and by their roots and lower branchlets, kept the water from rushing to the lower grounds, during violent rains, had been removed, and drains had been cut as vertically as possible, following the direction of the fall as much as possible, thereby still more adding to facilitate the swift course of the rainwater. The cutting of drains in this way is a great mistake. The water is permitted to rush off too quickly, thereby not only drying the ground too quickly but also taking with it every vestige of fine good soil, and thus impoverishing the lands more and more. I spoke to several farmers on the subject, and succeeded in making many converts to my opinion on the desirability of a different system of drainage on such sloping ground.

The basin of which I attach a plan, showing the different planting districts—the catchment basins of which the whole basin is formed, is situated in different formations of granite, lower silurian limestone, carboniferous and igneous rock and basalt. The treatment will, therefore, vary slightly, both on the account of the formation, as well as on account of the altitude and easterly and westerly fall, but the whole should be treated as one district, and be under the sole guidance of one forester.

“———obtained from Mr. W. J. O'Neill, a gentleman engaged by B.O.W. in connection with Lough Neagh for upwards of 24 years the following information.

The Summer level of Lough Neagh is at Toome Pier, about 46 ft. above the ordinary Spring tide of Coleraine. This gives the very small fall of 9" per mile for the outlet of water accumulated in the Lough, and in the case of heavy rains, as it has been proved by such experience, quite insufficient. The supply of water to the lake is derived from the following catchment basins:—

The Black Water River basin with an area of	618½ sq. miles	
Main River	313¾	"
Upper Bann River	208	"
Ballinderry River	161¼	"
Mozala River	140½	"
Six Mile River	92	"
Crumlin River	67¾	"
Portmore Lough	40¼	"
Stewart Town River	30¼	"
Closet River	28½	"
Ballygronan River	11	"
<hr/>		
Total	1711¾	"
Loure Bann & Lough Bay	340½	"
Area of Lough Neagh itself	153½	"
Total of Lough Neagh Catchment is therefore	2205¾	"

Of the area of the basin discharging water to the Lough Neagh, is about 1712 sq. miles. I consider 400 sq. miles fit for forest cultivation or about 256,000 acres.

The rain fall averages annually about 36", but it has been as much as 21 inches in 4 months and on some occasions it has been as much as 1" in 24 hours. It is, therefore easily seen that an enormous amount of water must be discharged through the lower Bann to prevent the flooding of the lowlands. The Toome Pier discharges about 400,000 c. ft. per minute when the Lough is 3 ft. above Summer level, and one occasion, when the flood waters reached 6' above this level the Lr. Bann shall have discharged nearly 700,000 c. ft. per minute, but then a great part of the flats must have been submerged already. The annual rainfall being 36" the annual rainfall per acre would be 130,680 c. ft. or for the 256,000 acres proposed to be cultivated 33,454,080,000 c. ft.

Let me presume that the Lr. Bann discharges during heavy rain 700,000 c. ft. per minute or 1,000,000,000 in 24 hours. If now, as has been the case before, there falls 1" of rain in 24 hrs. and it is calculated that at present at least seven-tenths of this reaches the lake in 24 hrs. the lake will receive in about 2,880,777,000 c. ft. as the weir will only be able to discharge third of the water. But this must be viewed in another light. The main rush of water will occur from the ranges, slopes and barren hills forming the 256,000 acres calculated for forestry culture. The rain falling on these will be heavier than

on the lowlands, and about nine-tenths of it will be discharged within 24 hrs.

With 1" of rain falling, the volume of water from these 256,000 acres will be close upon $\frac{1}{3}$ of the whole amount discharged viz. 929,280,000 c. ft. but—more likely—50% more for when heavy rain takes place, it always rains heaviest in the ranges and when these have been denuded of all vegetation and cuttings of drains the rush of water will be even heavier. That I have some foundation for this statement you will grant when I draw your notice to the following fact:— While the catchment basin of the Blackwater River contains about 618 sq. miles and the upper Bann is only 208 sq. miles, the latter discharges (during heavy rain) as much and more than the first named river and floods the lower parts much quicker. That the course of flood waters is much more violent in the Bann is also easily seen by the torn and waterworn banks of this river. The Slopes of the Upper Bann basin are much steeper and more barren than the sides of the Blackwater basin and therefore offer no resistance to the water rushing down to the lowlands. Having examined the various basins separately I consider the area cultivated should be distributed in the following proportions according to the character of their sides as well as with a view to the amount which seems suitable and obtainable, the last—being only a guess—as I had no opportunity of making enquiries about ownerships, tenants rights and all those questions which make the cultivation of these localities so intricate and difficult, but which are outside the object of this report although they are bound to influence the practical execution to a very great extent.

The proportion to be cultivated in the various basins should be:—

Blackwater basin containing	618 $\frac{1}{2}$ sq. mls.	80 sq. mls.
Main River	318 $\frac{3}{4}$ "	60 "
Upper Bann River	208 "	130 "
Ballingderry River	161 $\frac{1}{4}$ "	40 "
Mozala River	140 $\frac{1}{2}$ "	30 "
Six Mile River	92 "	20 "
Crumlin River	67 $\frac{3}{4}$ "	10 "
Portmore Lough	40 $\frac{1}{4}$ "	10 "
Stewart Town River	30 $\frac{1}{4}$ "	10 "
Closet River	28 $\frac{1}{2}$ "	5 "
Ballygronan River	11 "	5 "

Total 400 sq. mls.

Acknowledgement of assistance from the following is made with grateful thanks.

P. Chr. Nielsen. The Royal Veterinary & Agricultural College Arboretum, Horsholm Denmark.

Johnston Edwards Esq. M.B.E. President of the Royal Forestry Society.

Dr. Eileen McCracken, Portballintra, Co. Antrim.

BIBLIOGRAPHY

Howitz Daniel "Report on waste-lands" H.C.39. 1884.

Howitz Daniel "Forest protection & tree culture on water-frontages" in International Fisheries Exhibition 1883, Selected papers.

Mackey J. "Forestry in Ireland" 1934.

Forbes A.C. "Tree planting in Ireland during four centuries" in Proc. Royal Irish Academy xli. C. nob 1933.

"Danish Forest Graduates 1861 to 1936", 1936.
