



PART II.

PAPERS.

20TH MARCH, 1890.

ADDRESS BY THE PRESIDENT,

MR. A. D NELSON.

GENTLEMEN,—I have to thank you for re-electing me as your President for the ensuing year, and as the duty devolves upon me to deliver an address, this being the first meeting in the year, I trust you will not expect an extensive or elaborate expression of opinion upon the few questions I may touch upon to-night, as I need hardly say I have been labouring under a great disadvantage, being exceedingly unwell for the past few weeks ; this has prevented me giving due consideration to the important questions which I intended bringing before you. I must, therefore, apologise for any short-comings which may appear in my address ; and, in stepping into the arena, I must ask your attention, in the first place, to a question which, to the majority of us, as mechanical engineers, is of very keen interest.

We have had in New South Wales a cloud of depression hanging over us for a very considerable period, and which has had the effect of very much reducing the number of men employed in our workshops and offices, and as a consequence reducing the output of material which, under different circumstances, we should have. When I take up periodicals

and newspapers from other countries and glance over items of interest to the engineer, I often feel that our engineers labour under more difficulties and disadvantages than those of any other country.

In America, for some time past, trade has revived to a very considerable extent. Some six months after the revival of trade in America we find a change has taken place in Great Britain and various places in the Old World, absorbing to a large extent the labour which has been walking the streets for a lengthened period—a circumstance not only beneficial to the *employé*, but to the capitalist also. Patiently have I waited, thinking that this colony would ere this have seen the gleam of light radiating amongst us, dispelling the dark cloud, and causing the engineering industries to thrive and prosper. Many of us have tried to solve this industrial problem, but have failed in our efforts, and I regret to say I have no information to offer concerning any large engineering works having been carried out during the year, although I might say plants of machinery for the Government and Corporations have been and are now being erected; but, unfortunately for the engineers, they were not manufactured in the colony. It must seem strange, not only to the residents of the colony, but to those who manufacture our machinery in other parts of the world, that we, having everything that is necessary for manufacturing, every mineral and every facility to manufacture or construct whatever we require, I say, it must seem strange that we should seek in foreign parts for almost every particle of machinery we use. Even to the very Government, whose duty it should be to endeavour to build up the iron industry here, they evidently fail to see the force or necessity to place the colony in an independent position for its ironwork. Will the day ever come when the ores, which are lying in the bowels of the earth, in tons innumerable, are raised, smelted and forged for the use of mankind; or shall they continue to be hidden as they have been for centuries past? Can we find a man who has brain power sufficient to grapple with one of the greatest difficulties the engineers of the colony have to contend against? Is there no

possibility of burying, to some extent, political differences, and allowing the colony to progress in such a manner that it will give employment, not only to the surplus labour now existing, but to tens of thousands of people who may come amongst us to cast their lot with us. Surely the day is not far distant when some change will take place that will relieve the now seemingly almost insurmountable difficulties which stare the engineering community in the face.

Glancing at the exports of Great Britain I observe by the Board of Trade returns the total exports for the year 1889 was £248,092,000 worth. The chief items are metals, machinery and raw materials. The export of metals has increased considerably, especially in the form of machinery and engines, consequently if exports from one country increase there must be a corresponding increase of imports in others. In a colony like ours there should be a large scope for engineers. There are many matters of vital importance to the interests of this colony which rest entirely in the hands of the Government. Amongst these the interest of the engineering community is prominent. We are well aware of the fact that the Government are spending vast sums of money on education with the hope of qualifying our youths to fill positions in life, to compete with people in other parts of the world, and yet when their education is completed, and they are turned upon the world, there is no opportunity to obtain employment in that path of life which the Government have thought fit to educate them for. If we are not to be a manufacturing people, then, I maintain, the large amount of money expended is to a very great extent thrown away. Another item which I claim as a question worthy of the consideration of the Government and the people in this colony is that of settling the people upon the land. It is not my desire or wish to touch upon one theory or another, either single tax or any political question, but it is my desire to try to show what can be done in this direction by an active and energetic Government.

I will now take the problem of water supply, which is so little realised, as the most important factor in agriculture. In America

along the coast of the Atlantic, there is abundance of rain; in some parts heavy snow storms fall in winter, which are retained by the various forests covering the hills; therefore the streams do not run dry in summer, and a drought of a month is of rare occurrence; but in other portions the rainfall is extremely light; the small streams run dry, and a drought of over a month is not uncommon; still there is never a failure of crops over any extended area. In many parts of America the greater part of the rain falls at one time in the winter—a time it cannot be used. In the ordinary course of things the water would flow to the bed rock of the river, and flow on without benefiting the soil. The following extract from *Scribner's Magazine*, is of interest:—"Until very recently the people of the United States have not been much interested in this section from an agricultural standpoint. Up to this time there has been an abundance of good land unoccupied in the Mississippi Valley. The Far West has been the land of mines and ranches—a desert terrible in its vastness and barrenness. But nearly all the good farming land has been taken up. The Dakotas, which have been receiving and absorbing the mass of emigrants since the lands of Nebraska, Kansas, Minnesota have been appropriated, are now well settled states. When Oklahoma was recently opened twice as many settlers stood ready as there was land for them to occupy; still the great stream of European emigration rolls in upon us—the Eastern States still send their young men West. Where are all these new farmers to find the farms to work? In their search for them they are making their way into every part of the Western Plateau; they are at last by necessity forced to turn to the arid region hitherto unthought of as a field for agriculture. As these pioneers press on into this unknown land they find the common picture of it misleading. They find that if the country be a desert it is so only from lack of water, and not from the sterility of the soil. Wherever water is found in sufficient quantity they see crops in no wise inferior to the best grown in the Eastern or Central States. In the south-west they find many productions which cannot be grown anywhere else in the country. Most important of all, they find that the

rainfall, though small, is almost everywhere sufficient for farming, if it did not mass itself in unfavourable times of the year and disappear as rapidly. The problem is to so regulate, increase, or store this small water supply as to make fruitful this rich but idle soil. It is a problem full of interest to every farmer in the Great West, but on a larger scale a problem of the utmost moment to the whole of the United States, if not to the world. All land in the East is either in the hands of private owners, or covered with forests on mountain sides which are almost untillable. Nearly all the land of the central plain that can be cultivated by the natural water supply is already appropriated, and every acre will be taken up within a decade. In the west lies this immense territory—two-fifths of the whole—the greater part of whose soil is capable of rich return, but which now lies unproductive. Can this land in any way be covered with farms, and these millions of acres made productive? What a problem is this both for the present and still more for the future of our country and the overcrowded world. It is the problem of a reclamation of an empire. The people of the West are attacking this problem from every side. Governors are urging its importance in their messages, and legislators are memorialising Congress to turn their attention to the unrivalled fitness of their particular State or Territory for the trial of irrigation."

If the people of America are attacking the problem which is of such vital importance to their country, and not only their country, but to the whole world, and are clearly demonstrating how water can be stored, how irrigation can be carried out, how land which to-day is arid can be converted into fertile plains, where people can settle and bring up their families, where the surplus population from other parts of the world can flow and become part of the community, why cannot we do the same?

My experience of various large tracts of our country is that farmers could settle upon it favourably if it were not for the difficulty of the water supply. When we observe the Americans have gone back as far into the Western Territory as possible, where they have dammed up the waters in the mountains, laid

flumes and channels to an extent of 60 miles in length in many places to pour their waters over land which was valueless until the combination of capital and energy culminated in reservoirs to store their water during the whole year. If it is possible to do these things in the far west of America, I am sure it is equally possible in the interior of New South Wales, were the laws of the country are of such a nature as to permit the combination of capital and energy to step in and so regulate the water supply for irrigation purposes, as to enable the farmer to feel his independence of the rainfall, for the want of which so many of our farmers are very often ruined. Concluding my remarks on irrigation, I am disposed to think that if tracts of land owned by the Government could be irrigated by private enterprise under proper conditions it would be the means of settling farmers upon the land on a most extensive scale, the Government to let the land to people who desired to live upon it, allowing the company to make its own arrangements *re* irrigation.

I feel this question is worthy the consideration of all practical engineers and also of the Government if they desire to have people settled upon the land and to see the colony prosperous.

Another question which occupies the minds of some of our most prominent engineers here and all over the world is that of Electric Traction and Electric Lighting. If I am correctly informed, the Government or Railway Commissioners are exceedingly anxious to try experiments in electric traction. Now, much has been written recently in the public press with regard to the effects of the so-called panic which existed in New York some time back. There is no doubt but the articles which were written in many papers and periodicals throughout the world had the effect of damping the ardour of a large number of people who, prior to these articles being published, were anxious that electric lighting and electric traction should soon be accomplished facts. In some parts of England there was great dissatisfaction with the overhead electric lighting wires. In Exeter the local Electric Lighting Company were threatened with a prohibition of the extension, and in Dundee the consent of the Police Commission

for the erection of a single electric light wire was refused. Again in Glasgow the Corporation have been induced to affirm that $3\frac{1}{2}$ miles of overhead electric wires and cables constituted a risk to life and property. This was all the outcome of the panic created in New York. At this juncture the history of the agitation which has given rise to these troubles may be studied with advantage. It must not be forgotten that the outcry for the removal of the overhead wires in the streets of New York arose in the first instance not so much because of the dangerous currents, but rather because of the unsightliness of the wires and their well-known insecurity. As customary in the first or early periods of such events as the electric lighting of cities and towns (illustrations of which we have in our own colony), things are hurriedly run up in obedience to the pressing demands for the light, and the fact of there being no special officers to supervise on behalf of the public, invariably the wires are of the cheapest quality, and erected in the cheapest manner possible; in many instances, they are suddenly angling over into the streets, or coming into contact with property, which is very objectionable. This is the cause of the outcry, and as it seemed to suit the Municipal authorities and the various parties in power in New York to order the removal of all wires to conduits, an order was easily obtained, and a Commission was formed—called the Board of Electrical Control—to carry these decisions through. There is no doubt, looking at the matter in all its various phases, one of the most prominent being jealousy between the rival systems of Electric Lighting and Gas, they had evidently formed a conspiracy to use none but so-called harmless current, which is some company's speciality. We are informed that even the Press lent itself, or was deluded by this faction; and, in a very short space of time, every accident in the streets of New York was traced to high tension and alternating currents. This, then, is a brief summary of the cause of all the trouble which has arisen in New York with regard to overhead electric lighting. It is on record that the experience of a London Electric Supply Corporation shows only one serious accident has occurred in connection with the Comany's

wires, and that could not be conclusively traceable to the electric current. As a matter of fact, more progress has been made in Electric Lighting during the present year than ever, although a severe check was given at the onset by obstructive legislation and opposition of Gas Companies. In London, Electric Lighting has advanced very rapidly, and it seems as though many of the provincial towns have stepped into the sphere of activity, for the total number of "provisional orders" for provincial towns, deposited with the Board of Trade before the 19th of last December, was 157, and the towns numbering in all 118. Various companies and firms have also put in 112 applications, whilst local authorities have put in 45. This shows that anything which has been written concerning overhead lighting in America, irrespective of the fact that the wires were pulled down in the streets, and their streets put into darkness, has had very little effect in England, for a large number of English cities and towns are making every preparation for dispensing with the old system of gas lighting, and are accepting the more modern system of electricity. On every hand we hear of works being extended to meet the increased demand for this special class of work, whilst in order to keep pace with the extraordinary boom of business amalgamation of firms has taken place. To give a rough idea of the amount of business done in this line in England, there is one firm which, during the year 1889, completed, and held orders to be completed, engines alone for driving dynamos equal to 18,000 h.p. They have in previous years supplied similar engines to the extent of 12,000 h.p. In fact, electric lighting has opened up new channels, not only for the artisan, but the capitalist also; and it is to be hoped, in the event of our Government deciding to introduce an electric tramway, they will take every precaution in obtaining advice which will enable them to procure not that which is the lowest in cost, but a system which will be the best known up to date. The information published now with regard to the electric light is very extensive; even manufacturers in their pamphlets give valuable information to engineers who are desirous of improving their experience in this line, and I trust that whatever the ultimate result may be, we will not enter into any transaction of this kind.

until such times as we have decided conclusively which is the best system to adopt. In concluding my remarks upon electricity, I will quote from a very recent journal received from America, one which is considered a great authority on manufacture. It bears date of January, 1890, and it states that the Westinghouse Electric and Manufacturing Co. has just closed a contract with the Weelametta Light Company for a plant of 10,000 incandescent lamps and 100 Arc lamps together with all wire and machinery necessary for operating the same, and the current is to be carried 12 miles before being distributed, a thing never before attempted in America, for which purpose a specially constructed machine capable of producing a current of 4,000 volts. is to be used and the cost of the entire plant is to be 200,000 dollars. This is done even in the face of New York chopping down her wires, and perhaps her action was wise under the circumstances, not that there is any danger as I have shown from the experience of the London Company, who make it a point to put in nothing but the best prepared wires and complete their work in a satisfactory manner. I have in the course of my remarks wandered away a considerable distance from our own colony; this has been necessitated because of the small amount of engineering work, as I have already stated, being carried out in the colony.

I will now touch upon a question or two which I consider to be of importance. For years past we have had strict supervision of all marine boilers manufactured in the colony or coming here in steamers. We have had a staff of men qualified, and who carry out the duties of their office in a manner which I have every reason to believe satisfactory to all parties concerned. It is a question which has very often crossed my mind during my career as an engineer that the Government take such precaution with regard to marine boilers and allow land boilers to be constructed, repaired, or arranged in whatever manner the proprietor thinks fit.

My experience of some of the boilers in the interior of the colony, nay more, in the very heart of Sydney, is of such a nature that I say unhesitatingly that it is the duty of the Government to

appoint a qualified man to examine boilers and machinery and compel the proprietors to carry out the instruction he might give to them under a penalty of a severe fine. Invariably I find so long as the engine goes round and the machinery is kept in motion the proprietor is satisfied ; he cares not what the probable risk is, nor is he aware of the fact that through defects existing in the machinery he is paying hundreds of pounds for coal which, under different circumstances, there would be no necessity for ; and although the proprietor of machinery may be, to a certain extent, inconvenienced by the supervision, I have no hesitation in saying the information he would derive and the benefits accruing from the inspection would far more than compensate him for the periodical inspection of boilers. This was considered by the Engineering Association some years ago ; but like many other matters which have been brought before the Government, received considerable attention for a week or so, and ultimately is shelved for ever. While I admit it might seem out of place for this Association to make a suggestion on the point, yet however much it might seem unwise, nevertheless it is our duty as practical men to point out to the Government of the day and the people any risks which exist to life or property.

There is one important question which I trust during the ensuing year will receive careful consideration from some member of this Association, viz., the report by Mr. Price Williams on our railways. It is deserving the best consideration of every practical man in the colony, for if it is allowed to go unchallenged, it will reflect very much indeed upon the ability and qualifications of many of the engineers in New South Wales. I have no hesitation in saying that had it not been for the circumstance of my indisposition, I would have dealt with this in an exhaustive manner in this address, for I cannot understand how either the Government, or those who represent them on the Railway Commission, can accept such a sweeping assertion as is made in the report. The contradictions existing on the face of it are so flagrant, that it does not require a man of very extensive brain power to glean sufficient information to draw conclusions which do not reflect credit on

those who accepted the report. We have now arrived at that condition in this colony, so far as railways are concerned, that those in power believe there is no man here qualified to do anything in the way of organising, supervising or carrying out railway work; every man who is required is imported. If we want a clerk he must be imported; if we want an engineer we must import him, and I say, with all due respect to the Government, they may have been guided by a desire to remove what was called political influence; but, unfortunately, they have succeeded in the new *régime*, according to the Press, in establishing what may be called friendly patronage. If practical men are not to deal with this question, whose duty it is to see that the sum of one and a-half millions of money is not squandered? We cannot expect the commercial man to express an opinion on a practical question, and if the engineer will not, then the people of the colony must be simply robbed by actions of this kind. This question must be ventilated, and should be in the public Press, and the thoughts and ideas should emanate from the members of the Engineering community.

I trust ere this session closes a paper on this question will be read before us, so that we may be granted an opportunity to express an opinion, so that the public Press may understand what the views of practical and experienced men are. The peculiarity with regard to filling various offices in the Railway Department is so significant when compared with the appointment of officers to the Water Conservation branch that it tells its own tale. The latter body have selected men of intelligence, men of large experience in the colonies. They found there was no necessity to import them, and I claim if they can obtain their officers in New South Wales the Railway Department also could do the same, for according to the theory laid down by the present Minister of Works in an address delivered a few weeks ago, he claimed that engineers in this colony were equal to any in the world.