PART II.

PAPERS.

12TH MARCH, 1896.

ADDRESS BY THE PRESIDENT.

MR. A. D. NELSON.

IN taking the chair to-night for the purpose of opening the twenty-sixth session of this Association, it is my first duty to thank you for the honour of re-electing me your President for the fifth time, and I trust that in the event of my not being able to be as regular in my attendance in the future as in the past, members will kindly take into consideration that I have more duties to attend to than I had in the past; but while I fill this position I will do all I can to carry out the duties which may devolve upon me in a satisfactory manner. From my past experience I know that I have an energetic Council, who will render me all the assistance in their power; and knowing that they have the interest of the Association at heart, I am justified in saying they will do all they can for your interest; but the Council's duties have a limit, and when that limit is reached the duties of members begin. The Council may work with all the energy they possess, but of what use will that be if members do not come forward with papers to be read at our meetings, or if they neglect to pay attention to the notices from the Secretary? I am willing to admit that our meetings have not been as large as we would like them to be, and in many

instances I am aware of the reason. I am also aware of the reason so many of our members have tendered their resignation, not that they desire to do so, but the great depression which has existed in the engineering business in this colony has compelled them to leave us. It has compelled men of ability and experience to leave our shores in search of employment in other parts of the world, and it stands to reason that when the man who designs is not required, the avenues of labour for the workman will soon close. They have closed in many instances completely. Yes, the doors of many of the engineering shops are closed, and the men scattered to the four winds of Heaven; but we must hope this depression will soon leave us, and that the ring of the hammers will be again heard in those shops which are to-day as silent as the grave. I do not wish to make any further comment on the question of the depression. Each of you who are employers of labour know well, without remarks of mine, what a bitter experience the workmen in the iron trade have had. No doubt, a change will come some day. Those who rule the country should know that in peace or war the engineer is an acquisition to the country, and without the engineer the world would cease to progress.

Although we have lost some of our old members during the year, yet the number of names on the roll is 145. We must not complain, but continue in our efforts to build up the structure the foundation of which was laid 26 years ago; and no greater assistance at the present time can be given to the Council than by members paying their dues, and thus strengthen the hands of the Council in publishing our proceedings. When I tell you that we have the sum of £290 10s 6d on our books, money due by members for subscriptions, you will quite understand how difficult it is to carry on the business of the Association in that efficient manner which has always characterized the work of your Council in the past. I trust members will kindly note my remarks, and assist the Council to get the next volume of the Proceedings printed and circulated amongst us.

Our volume of Proceedings is now known to all kindred Associations throughout the globe. The system of exchanging with kindred Associations tends to increase our library with a stock of knowledge right up to date.

During the past year the Association held nine meetings, the average attendance being 40. The papers contributed were by Mr. W. Reeks, on double-ended screw ferry-boats; Mr. Norman Selfe, on the rise and progress of lift construction in N.S.W; Mr. Auldjo, on refrigeration; Mr. Napier, on hot water circulation; Mr. Nangle, on roof covering; Mr. A. M. Howarth, on proposed *sub-aqueous* viaduct across Sydney Harbour from Dawes Battery to Milson's Point. The discussion on some of the papers extended to a second night.

During the year we held a number of excursions and a smoke concert. The latter the Council intend to hold annually. Both the concert and the excursions for the present year are receiving the careful attention of the Council.

Now that I have touched on a few matters directly connected with our Association, I would like to say a few words upon a subject or two which will eventually occupy the attention, not only of engineers, but the whole of our population First, I would say a few words relative to the gigantic undertaking of the Smelting Co. of Australia.

The Works of this Company, when finished, will be situated within half a mile of the shores of Lake Illawarra and two miles from Dapto. Dapto is a Railway Station, about 57 miles from Sydney, on the South Coast Line.

The Works of this Company, when completed, will be connected by a branch line of the same gauge as the Government Railway; this will allow the fuel, fluxes and ores to be delivered right on the plant for treatment. I am informed that the Company are actively engaged making a harbour at Lake Illawarra, by which means all ore sent by water will be landed right at the Works. The position selected by the Company is good; access is easy by land or water; it is well

situated for fuel supply, being right in a coal centre. I do not think there is any reason for me to go into details with regard to the difficulties which have been experienced in smelting refractory ores from our silver mines in the past, nor do I think I need call to mind the gleam of light which shone in the distance when some of us handed our cheques in for a few hundred shares in a new mine with a high percentage of silver, etc., as per assay, during our mining boom; nor do I think it wise to say one word about the report from the Manager that the ores would not smelt refractory, better shut down and sell the plant. We have had too much of this in the past. I have dealt with this subject before, and I have stated that men of no experience or knowledge were pushed into positions, and have ruined the mining industry and many a family.

Let us hope this is going to be the beginning of a new chapter. This Smelting Company of Australia have designed their Works for the treatment of refractory ores, more especially the zincos sulphide of lead ores of Broken Hill and other districts.

They are also making provision to treat all kinds of base refractory gold ore. The plant, I am informed, will be large, and ample provision made for extension as business increases.

It is the intention of the Company to purchase all kinds of ores on bulk assay, according to the quality of the ore. It will be stored in bins, except the oxidised ores, which will all go straight to the furnace.

The process for treating sulphide of lead ore is quite new. The ore is first crushed and roasted, after which it is leached with sulphuric acid to dissolve out the zinc, and from this solution metallic zinc will be produced by electricity, and I am informed the Company have another process which they intend adopting later on.

The ores that will not require roasting, together with the residual ores, after leaching the roasted sulphide of lead to

obtain the zinc, will be all smelted in a blast furnace to recover the valuable contents, lead, silver, gold, etc. The bullion thus obtained will then be treated to separate the metals.

This is an undertaking in which a large sum of money must necessarily be spent in the construction and maintenance of the plant. Again, a large amount of money must be circulated in purchasing ores and working the plant. It must mean additional work to the railways of the colony, in bringing ores and fluxes to the works, and the lead, &c, to the market. Last but not least, it will give our mining a start, it will cause many mines which are shut down to be re-opened and a large number of the unemployed will be absorbed; and for the last reason alone, I trust the Government will render this Company all the assistance they possibly can, to make the undertaking a success.

Some people think this is a work the Government should take in hand. With that I cannot agree. Let private enterprise step in and carry out such undertakings. To my mind, the Government have far too much on their hands. They employ too much labor. Private enterprise should step in and relieve them of one-half of the labor they now employ. It is well known what the condition of the Government service was in years gone by—a disgrace to any country on the face of the earth; but this is supposed to end now, and let us hope it will.

There is another subject I wish to say a few words about, and that is the iron manufacturing industry, or rather I should say the iron deposits of the colony. It would indeed take up too much time to go to any extent on this question. I will briefly deal with one locality which I have visited several times to make myself conversant with the deposits in that district, viz., the district of Wallerawang. As you all know, Wallerawang is situated about 105 miles west of Sydney, at the junction of the Mudgee line. Piper's Flat is about 6 miles from Wallerawang on the Mudgee line. It is here that the principal deposits of ironstone are to be found, which, according to analysis, will

go about 60 per cent. and are almost free from sulphur. In this district there is unlimited hard split coal, well suited for smelting purposes without coking; also unlimited limestone. The three ingredients necessary to make steel or iron are there, and yet we have to depend on another part of the world to supply our wants. Professor Liversidge read in 1874 a paper before the Royal Society, in which he gave some valuable information, and in concluding his paper, he said :—"I think I may safely say that this portion of the district of Wallerawang seems to be destined to be one of the most flourishing and greatest portions of the colony. Here, within a comparatively small circle of some four miles diameter, there are extensive and rich deposits of iron ores, coal, and abundance of limestone. At present nothing beyond exploratory work has been done with them; but as a Company has taken up large selections of the lands for the purpose of erecting ironworks, there is a prospect that in a short time an attempt may be made to utilise some of this great wealth. The whole of the district along the western line near to and beyond Hartley is one of exceeding interest to the geologist, from a purely scientific point of view, quite apart from the importance and actual intrinsic value of the various mineral deposits which it contains.

"It is a source of great gratification to all who take an interest in these matters that, at last, the resources of this and other portions of N.S.W. stand a fair chance of being thoroughly and properly examined, now that the first step towards having a geological survey of the country made has been taken by the Government—a step which may be regarded as an earnest of something to follow on, on a more comprehensive and extended basis, for, of course, it is utterly impossible for any one geologist, however great his attainments, to make single-handed a finished survey of a country like this.

"No one will deny that money spent upon such an object is spent in one of the best possible ways, whether it be purely for the extension of scientific knowledge or merely for the

exploration and development of the mineral wealth of the colony. Perhaps the the truest wisdom is to keep both ends in view. The extension of science would make but comparatively little progress without the aid of wealth; and wealth, at the present day, cannot be attained without calling in the aid of science; they are mutually dependent, and on that account we cannot afford to neglect either of them.

"The exploration and development of the mineral wealth of a country should always be kept a long way in advance of the wealth of realising and converting such stores into money.

"When we consider the great repositories of iron ores which have been already examined in N.S.W., and that we hear of the discoveries of others, perhaps equally extensive, there appears to be no reason why N.S.W., with proper care and management, should not very soon make not only all the iron required for its own consumption, but also supply other countries which are not so lavishly endowed."

I would ask you whether words such as these, from one who has held a reputation of the very highest order amongst us, should be passed over lightly. When the Professor wrote those words I am satisfied, from my own knowledge of the locality, that he did not write one word more than he was justified in doing under the circumstances. There is no doubt about the ore; it can be taken out in the same manner as an ordinary quarry, opened at the surface, and worked down in benches. The cost of getting the ore is thus reduced to the lowest. Nor is there the least doubt about the coal; there are 1500 acres of coal land. It has been opened out, showing three seams of good coal. The top seam 4ft. thick, the middle 7ft. thick. About 12 acres of this seam have been worked, and has given every satisfaction for steaming purposes. The bottom seam is 17ft. thick. Now, from the foregoing, you will see there is unlimited fuel of first-class quality to smelt ore. So far as the limestone is concerned, I need say nothing, as you are aware the Cullen Bullen Lime and Cement Works are adjacent

to this property, and the whole district abounds with limestone. I have had some figures put together to give you an idea of what it would cost to produce iron in this district once the plant was erected. It has been proposed to erect two furnaces, equal to an output of 600 tons per week. The cost to produce this would be as follows :—

MATERIAL.

	£	s.	d.
Coal, 1800 tons at 4s....	360	0	0
Ore, 130 tons at 2s. 6d.	168	10	0
Limestone, 320 tons at 2s. 6d.	40	0	0
600	568	10	0

Equal to 18s. 11⅔d. per ton.

LABOUR.

4 Keepers, 7 days at 10s.	14	0	0
4 Sluggers, 7 days at 8s.	11	4	0
4 Helpers, 7 days at 6s.	8	8	0
12 Fillers, 7 days at 8s.	33	12	0
4 Stoking Stoves, 7 days at 7s.	9	16	0
8 Labourers, 6 days at 6s.	14	8	0
2 Cinderfillers, 7 days at 6s....	4	4	0
3 Pig Lifters, 7 days at 8s.	8	8	0
2 Engine Drivers, 7 days at 10s.	7	0	0
2 Firemen, 7 days at 7s.	4	18	0
1 Donkeyman, 7 days at 5s....	1	15	0
2 Tippers, 6 days at 7s.	4	4	0
2 Weighmen, 7 days at 6s.	4	4	0
1 Engineer, per week...	5	0	0
1 Blacksmith, do.	3	3	0
1 Smith's Helper, do....	2	5	0
1 Watchman, do.	2	2	0
1 Groom, do.	2	2	0
1 Weighman, do.	2	2	0
2 Horsedrivers, do.	4	18	0
3 Horsedrivers, do.	6	6	0
1 Locodriver, do.	3	0	0
1 Stoker, do.	2	8	0
5 Horses, do.	3	10	0
Clay Grinding, do.	2	2	0
Management, do.	10	0	0
	£174	19	0

Material	£568	10	0
Labour	174	19	0
Office Expenses	8	0	0
Stores	3	18	0
Depreciation in Plant ...	10	0	0
600	£765	7	0

Equal to £1 5s. 6d. per ton.

This would only be dealing with pig iron. Of course, it would be converted into merchant bars, steel rails, or, in fact, any class of iron or steel required. I have been as brief as I possibly could, and have only touched the subjects in the lightest manner possible. My object in dealing with this matter is to try and induce you to look up the question for yourselves. I want you to consider that we are importing thousands of tons of iron and steel into the colony each year; at the same time we have unlimited minerals; in fact, everything that is required to start the industry. The question is, why do we not start it? Why are the furnaces not blowing to-night? The reason is, we have no market. Let the Government say they will grant a reasonable concession, and the works, no doubt, will be an accomplished fact in a short time. A quarter of a million of capital will have to be sunk, and on good authority I can say there are people in the old world willing to find it, but it cannot be expected that they would expend this large amount without having a guarantee that they could secure the N.S.W. market.

In conclusion, I will read you an extract from a Japanese paper, dated January 10th, 1896:—"The proposal to establish an iron smelting works has at length matured, and estimates to that end find a place in the budget for the 29th fiscal year. The considerations that have urged the Government towards this step may be stated briefly thus: The demand for iron in various forms has steadily increased in Japan during the past year, and is still growing, the use of material for industrial as well as for war purposes being more and more extended. In the absence of a smelting works there must inevitably be a large outflow of money from the country for the purchase abroad of that which it might supply, and the offensive and defensive equipment of Japan must be seriously crippled if she is dependent upon other countries for this important class of material. It is only necessary to consider her situation, if under those conditions she should have her channels of supply

cut off, to see what effect her dependence on outside sources would have upon her arsenals and ship-yards."

"It is estimated that in Japan at present there is a yearly demand for 130,000 tons of iron, and the Government, being quite sensible that at present that quantity is beyond the available resources, have decided to provide only for the manufacture of some 60,000 tons per annum, 20,000 tons Bessemer steel, 20,000 tons Martin steel, 4,500 tons wrought iron, and 500 tons crucible steel. To private enterprise will be left the work of smelting pig iron; but if that should, as it probably will at first, prove inadequate, then the smelting works will smelt such metal, up to 42,000 tons or such quantity as may be necessary for the output of Bessemer steel. The cost of the smelting works is estimated at yen 4,095,793."

On this I will make no comment further than to say if the Government would follow this good example, and only grant the concession, the capital will be forthcoming. Further, I have no doubt the majority of the members take an interest in the quantity of iron, raw and manufactured, which is imported into this colony. To those who have not looked into this matter I will say a few words, for it is as well that members should have some knowledge of the large quantity of iron imported. It will have a tendency to illustrate the prospects of a company manufacturing iron for N.S.W., as well as the prospects if federation was an accomplished fact, and the company was manufacturing for the whole of Australasia.

In angle, bar, and rod, we have imported £51,989 worth—hoop iron, £17,926; plate and sheet, £29,784; pig, £19,611; pipes, £61,279; other castings, £8,476; scrap, £7,489; bolts and spikes, £20,784. These are a few lines we meet with daily, and you must admit, if business was brisk, the demand would be far greater. To-day I obtained from the Government Statistician's office the whole of the imports in iron and steel, raw and manufactured, for 1895, the total value of which amounts to £1,415,637

—a fine sum to keep in the colony and distribute among the workmen, if we could only manage it.

I wish to say I have no interest in this land of which I have been speaking. I do not know who the company is that owns the property, although I have reported on the land for the agent of the company in this colony.

I do not own land that I wish to make money out of by selling. I am actuated by patriotic principles, and shall do all I can to see the manufacturing of iron in this colony an accomplished fact.