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## ON RAILWAY BRAKES IN NEW SOUTH WALES.

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### I.—HISTORICAL.

In the year 1884, when in San Francisco, the author met the late Mr. Hanscom, a gentleman who at that time was well known as a leading authority on cable tramways. In 1886 or 1887, after he had returned to Sydney, Mr. Hanscom sent over particulars of a new railway brake (his own invention) which was then in use on one of the Californian railways, with a request that it might be brought under the notice of the railway authorities of New South Wales.

Before this the author had taken considerable interest in the action and efficiency of the principal railway brakes in use from a mechanical and scientific standpoint, and he at once saw that the Hanscom Brake overcame two most important drawbacks to the Westinghouse system, viz.: the entire severance of the driver's control from the brake cylinders during application of the brakes, and "the impossibility of graduating off." He therefore acceded to Mr. Hanscom's request and brought it under the notice of the authorities of the day, for it seemed to him that no harm could possibly come from our railway managers being fully posted in a recent brake

invention, even if they did not adopt it. He also decided, as the subject was a most interesting one at that time, on account of the Burlington Brake trials (full particulars of which he had just received direct from Burlington), to read a paper on "Railway Brakes" before this Association.

It so happened that, a few weeks before the paper was ready, the most characteristic railway accident that has yet occurred in this colony took place, viz.: the runaway of the train from Hornsby to Peat's Ferry, through the failure of the brakes, on June 2nd, 1887. As a consequence, great interest was taken in the question; a larger attendance was present at the reading, and a longer discussion followed upon it, than any other subject before our meetings had up to that time secured.

It was very singular, and a most important outcome of the discussion, where a number of qualified persons were enabled to speak freely, that information which coroner's juries, special commissions, and acres of newspaper correspondence could not produce, came out here spontaneously, and facts were elicited in the course of the statements made in this room which set at rest in the minds of dispassionate and disinterested experts whatever doubts there might have been up to that time as to the true cause of the accident, and made it certain that it was due to certain *inherent defects* in the Westinghouse Brake, and not to the shut-cock theory which had been so plausibly put forward.

In the discussion before this Association, as well as in that which took place in the Press, the immense efforts which the representatives of the Westinghouse Company were taking in the matter of upholding and defending their brake by special pleading were manifested, they largely utilised one daily paper to uphold their interests, and a recent reference to printed papers has called to mind how much the views of independent critics were misrepresented; but the money at stake was immensely large, and it is clear that if any person wants

to supply brakes to the railways of New South Wales, he must play a high game. That enormous profits attend the present arrangement, and will attend the future supply of brakes, *if imported*, goes without saying.

Although the author brought Mr. Hanscom's brake into notice in New South Wales in 1887, he let it be clearly understood at the time, and stated distinctly on several occasions, that he was only the *pro tem.* representative of that inventor. The celebrated Burlington Brake trials in the same year had given him a broad scientific interest in the question far outweighing any temporary personal interest in the Hanscom. He was particularly struck by the Carpenter Brake, which gave such satisfaction at those trials, and thought it possible to devise a brake which should combine the good qualities of the Carpenter, Hanscom, and Westinghouse systems, without their defects. As a result of his efforts he put some ideas into shape by preparing the drawings before you. Many here will remember that before concluding with the Hanscom Brake discussion, the author said he had a brake proposal of his own in shape for discussion, but he looked upon it (as before stated) from a technical, rather than from a commercial, point of view—was not at all proud of it, and therefore put it on one side for two years, during which time the brake question never troubled him at all.

It is well known that most enormous profits attach to the supply of railway brakes; in the case of New South Wales the bulk of such money, unfortunately, goes out of the colony. Now, although he takes no active part in politics, the author has for thirty-five years earnestly and consistently endeavoured to have as much engineering work done in the colony as is practicable with real and ultimate economy. He was certain that the brakes then in use could be made in the colony for far less than they cost the Government (apart from royalties); that they were susceptible of improvement is proved by the alterations since made by the Westinghouse people.

Seeing then, that we had workshops and operatives here in Sydney capable of making brakes as well as those at Pittsburg, and, further, that it was absurd to suppose the end of invention had come with the Westinghouse Brake then in use, his idea was, that the then newly-appointed Railway Commissioners would be sure not to treat the extension of one particular brake to their goods stock as a foregone conclusion, but would carry out some original investigations under their own officers (as the railways were to be managed on a commercial basis), as they would naturally want the best and cheapest article obtainable. Therefore, in the hopes that something might be done which would lead to brakes being made at Eveleigh, the author, with some apologies, as he was not directly connected with the railways (although he had designed the gas lighting system then and since in use on them), sent the plans now before this meeting in the most perfect good faith to the Commissioners for Railways on November 15th, 1889. He naturally thought there was no desire to repeat the Peat's Ferry episode, and, as it was to the interest of the community that there should be not only local manufacture, but an increase of safety, he felt as much justified in trying to do something in this as he had done in other matters—the Circular Quay and City Railway for instance; in the former of these cases his actions certainly saved the colony at least £120,000. There was nothing said about remuneration in the communication to the Commissioners accompanying the plans, let it be clearly understood.

The Railway Commissioners did not, on receipt of this letter, send for the author, nor did they even ask him to explain the action of the brake, and, as it is presumed they thought there were no other engineers in the colony who understood these things so well, they handed his plans over to their newly arrived engineer, Mr. D. H. Neale. Mr. Neale did not ask for a meeting on the matter, although he wrote to ask a question or two, and the author heard nothing about these plans for eighteen months. As soon, however, as it

became known that a special board of experts had been appointed at the public expense to inquire into the whole question of railway brakes, the author wrote again to the Commissioners on June 1st, 1891, this time asking them to submit his designs to the consideration of the Special Brake Board.

From the fact that an experimental electrical tramway installation had been imported for Waverley at a cost of some thousands of pounds, there seemed to be a desire to take advantage of any possible improvements, and, as the knowledge gained by that experiment on what was already well-known appeared to be *nil*, it was certain that nothing less than nothing could be gained by an inexpensive investigation into a new brake proposal, however inexperienced and innocent the proposer might be. The author knows well that there is hardly any greater sin in New South Wales than for a person to try and serve his country. He had a desire, however, that he might in some small way assist in building up a New South Wales Railway Brake, and thus help to keep in the country the hundreds of thousands of pounds which are sure in the near future to be spent on these appliances.

The author is further strongly of opinion that whatever brake is used on the Government Railways should be the property of the Government out and out, whatever may be the price paid for it; and that such price should be settled before, and not after, it is determined what amount of rolling stock is to be fitted with the brakes. Read the conditions attached to the Westinghouse pamphlets, and say if it is not absurd for our community to place itself hand and foot in the power of a commercial corporation, so that the Railway Managers are not their own masters in one of their most important appliances.

By the courtesy of the Secretary for Railways a reply was sent to his letter of June 1st, and he also received back most of the papers he had forwarded; they were not put before the Brake Board, and are therefore available for this evening's business.

In the meantime there has been an extraordinary development. This Brake Board before referred to has conducted trials with two brakes only, and has brought up a report. From the Daily Press of the 3rd instant we have the following information:—"There were five Members of the Board, four of whom are well known engineering experts, viz., Mr. Cruickshank (Marine Board, New South Wales), Mr. Rotheram (Locomotive Superintendent, New Zealand Railways), Mr. Thow (Locomotive Engineer, New South Wales Railways), and Professor Warren of the Sydney University; the other member was Mr. D. H. Neale, a gentleman whom the author has the pleasure of knowing personally, but who, as an engineer, is as utterly unknown to him as he probably is to every other member present this evening, through being a recent arrival in the Colony; this gentleman, of course, may have been most distinguished in his own country, but if such is the case, we, unfortunately, never heard of him before his advent among us.

The author does not really know, as things stand, whether Mr. Neale understands this brake or not, or whether he ever reported upon it, or whether it is quite an old idea, long ago tried and found wanting—these are unimportant matters. We all do know, however, what is very important for the people who have to find the money, and own the railways, that the same Mr. Neale stood alone in his advocacy of the Westinghouse Brake after the recent trials, and that the four other, and much better known experts, advocated the Vacuum Brake; and we do know further, that the *Sydney Morning Herald* published at the same time—and with the General Report of the experts—an Independent Report by Mr. Neale, *solus*, which was as long as the report in chief sent in by the full board, less himself. A document which there can be no hesitation in characterising as a piece of special pleading for the Westinghouse Brake, in fact one, on reading, would almost think Mr. Neale was a Westinghouse agent. The most remarkable thing about the publication of these

reports, which must have struck every right minded man, was the injustice of publishing a lengthy and special dissent of this kind by one member out of five without first asking the other Members of the Board for their reply, and then publishing the reply with the dissent. The matter, to say the least of it, looks extremely "crooked," and it is, according to the Parliamentary reports, being enquired into in "another place."

Furthermore, it must be distinctly borne in mind that the scientific and commercial aspects of the Westinghouse Brake are two different questions. In 1877 we were told by its agents that it was, in effect, perfection, and that the end of invention had been reached; to-day we are four years nearer the expiry of the patents covering such invention, and therefore that *perfection* will soon be public property, so that our railways can be fitted with such *perfect* article on Freetrade lines. Supposing, however, new patents can be secured for some modifications in this brake, and that our railways can be committed to them for another 14 years, is it not easy to be seen that it may mean hundreds of thousands of pounds to the fortunate proprietors of such patents, and at the same time hundreds of thousands of pounds out of the pockets of the people of New South Wales. What wonder, then, that (the world being what it is) we find such great efforts being made to keep such a good thing in its present hands, and that special pleaders can be found to support the *statu in quo*, however much they may be in a minority. Surely Parliament will have this Brake Report business sifted to the bottom, and let us know on what principle one unknown man is better than four tried and tested ones.

The foregoing facts have seemed to the author to furnish sufficient warrant for introducing the Brake Question to this Association a second time. Before proceeding to explain the plans on the walls, he would wish the members to clearly understand that this particular brake is no cherished fancy of his, and that he has no enthusiasm in it; neither does he expect it to be reproduced in English and other Scientific Journals, in

the same way as previous papers of his, read before this Association, have been; but the brake is here for vigorous, outspoken, and scathing criticism. If the result is to show clearly that it is all defects, and has no merits whatever, still the discussion cannot be otherwise than a lesson to our young members, and will, perhaps, be of advantage to us all from the mutual interchange of scientific opinions. There is one thing that should be pointed out before discussing this brake, and that is this: on a former occasion gentlemen not members of our Association, but who were commercially interested in brakes, were by courtesy allowed to take part in the discussion, and it is to be hoped they will do so again.

## II.—DESCRIPTIVE.

The claims made on behalf of the Differential Brake are:—

1. It is a pressure brake and would utilize the steam pumps, reservoirs, and generally the brake plant at present in use on our railways.
2. It can graduate the brakes both off and on (which the Westinghouse cannot do, but the Vacuum can), a most important feature on mountain lines.
3. It keeps up the supply of air in the brake reservoirs and cylinders when the pistons are leaky, however long the down run may be. This is impossible with either the Vacuum or Westinghouse systems, and renders a repetition of Peat's Ferry experience impossible.
4. It enables the driver to work by rule, and not by guess in putting his brake pressure both *on* or *off*, and enables him to see what pressure is operating in the brake cylinders by a reference to the gauges provided.
5. The driver never severs his connection with the brakes, and does not require to take them off to replenish the brake reservoirs.