Safety

Westinghouse - Notes for Big Business:

"By the fall of 1881 the Westinghouse automatic air brake was in use on over 3164 locomotives and 17,290 cars in various foreign countries, ranging from over 1087 locomotives and 7719 cars in Great Britain, and 1416 locomotives and 7193 cars in France, down to one locomotive and six cars in Sweden. In the United States, 3435 locomotives and 12,790 cars were equipped with it. Of the fourteen British railways employing it, the largest patrons were the North-Eastern, the London, Brighton, and South Coast, the Great Eastern, the North British, the Caledonian, and the Glasgow and South-Western systems. The statistics, here given, moreover, do not include the straight-air brakes, of which a very large number were still in use on railways which had bought them before the automatic brake came into general notice. As a fitting conclusion to the catalogue of ten years' achievements, Europe was dotted with manufacturing establishments where hundreds of mechanics were busy producing Westinghouse brake apparatus, with a combined capacity for equipping an average of three hundred locomotives and twelve hundred cars every month." (Notes here are taken from Leupp, Francis. George Westinghouse, His Life and Achievements. 1918 P. 90)

Westinghouse had received his first air brake patent in 1869. July of that same year he had organized the

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Westinghouse Air Brake Company under a Pennsylvania charter with a capitalization of $500,000. He had a distinguished Board of Directors, all men who had seen his invention perfected and had become convinced that the air brake was the brake of the future. These men included Robert Pitcairn, W. W. Card, Andrew J. Cassatt, Edward H. Williams, G. D. Whitcomb, Ralph Baggaley, and, of course, Westinghouse, who became first president of the corporation. John Caldwell was elected treasurer.

The Westinghouse device had been, up to this time, used almost entirely for passenger service, but the need of special braking for traffic grew.

(Look up list of accidents in this period due to difficulty of handling the increasingly longer and heavier freight trains.)

Westinghouse was alive to the field here and gave his entire time to the means of increasing the speed of action to his brake on long and heavy trains. (Page 93)

There were various competitors and in the Spring of 1886 (Page 92) a committee to conduct a series of competitive tests was arranged at Burlington, Iowa. This began in 1887 (Page 84). Westinghouse lost, but was not discouraged. He was convinced that he could his perfected brakes so that it would work. The Master Car Builders' Association was the one to decide and in 1888 a series of conditions which

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any brake must meet - "your committee does not recommend the adoption of any particular brake, but considers that a freight train brake should fulfill the following conditions:

"First. It shall work with air of seventy pounds pressure. A reduction of eight pounds shall set the brakes lightly, and a restoration of pressure shall release the brakes.

"Second. It shall work without shock on a train of fifty cars.

"Third. It shall stop a train of fifty empty freight cars when running at twenty miles per hour within two hundred feet on a level.

"Fourth. When tried on a train of fifty cars it shall maintain an even speed of fifteen miles an hour down a grade of fifty-three feet per mile without variation of more than five miles per hour above or below that speed at any time during the descent.

"Fifth. The brakes shall be capable of being applied, released, and graduated on the whole tain by the engineer, without any assistance from the brakemen or conductor.

"Sixth. The hose coupling shall couple with the present Westinghouse coupling."

(Leupp, Francis. Westinghouse, His Life and Achievements. 1918 P. 101)

Now these conditions were met by none but Westinghouse brakes and that says Leupp in his account in his story ended the "battle of the brakes."

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By the beginning of the '80's gas was being used extensively in various places as a fuel, but experimentively - not very confidentially. All the oil regions of Pennsylvania and West Virginia had so long treated gas as a kind of necessary nuisance in the production of oil, siphoning it at a safe distance and letting it burn night and day. Indeed the hills of that rolling land were made picturesque at night by these hugh flaming torches passing in the wind.

It was in the winter of 1883 and 1884 that Westinghouse in New York City read of an experiment made in the vicinity of Pittsburgh in a factory which seemed to show that gas had been used with a saving of a good many thousand dollars in a single year.

He immediately began to calculate the possibility for public as well as private service and back in Pittsburgh in the Spring of '84 he drilled a well in his own back yard - gas was struck with startling effects to the family at about 1560 feet and the development of this and other sources in the vicinity was immediately begun as a practical fuel. It was in July 1st of that year Westinghouse took out his first patent - a system for conveying and utilizing gas under pressure. (Page 362 - The Life of George Westinghouse. Prout, Henry G.)

The object of this first invention was very interesting (Page 36) In the next two years Westinghouse took

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out twenty patents in quick succession for the purpose of protecting and preventing leaking, that is, his mind seems to have been first centered on ~~first~~ making gas safe. The same motive ~~which seems to be~~ behind his long work over air brakes and over his system of signals, ~~bridges~~ switches, to be moved by compressed air. (Page 221 - The Life of George Westinghouse. Prout, Henry G.)

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