

coke. This statement is not intended to refer to the use of iron with a low sulphur content to prevent the constant increment in sulphur which occurs from remelting with coke, but refers to the value of charcoal iron as against coke irons. Good results have certainly been obtained from the latter if properly handled, but on the other hand if any advantage in strength can be shown for charcoal iron the additional cost is not worth considering. The great question at the present time is that of improving the quality of the chilled wheel. It has only one serious point of weakness, the danger of broken flanges. The records show that the number of broken flanges has been greatly reduced since 1908. If this is correct, the causes are, the reinforced flange, careful manufacture, good inspection and a rather hard wheel. The reinforced flange was introduced in 1906-7 when the 600 lbs. wheel was changed to 645 lbs. and it would appear that this change made a

grey iron beneath it taking less than its share on account of its greater elasticity. It is therefore necessary to maintain a sufficient depth of white iron to resist a force of this nature, which is that brought on the flange by the rail, and it is evident that the white iron is greatly assisted when backed up by a large amount of grey iron, which is the case when the flange is reinforced as in the latter designs of wheels. This is probably the correct explanation of the greater amount of flange breakage with soft wheels, and it is apparently confirmed by the results that have been obtained.

There is good ground for expecting that the use of the reinforced flange and better knowledge of the causes governing the strength of white iron may lead to considerably better results being obtained from the chilled wheel in the future.

On light equipment, with less severe brake service than is usual today, the chilled wheel has given excellent results and is

Book Reviews.

Any of the books reviewed may be obtained through Canadian Railway and Marine World at the published price.

AMERICAN RED CROSS ABRIDGED Text Book on First Aid (Railroad Edition).—By Major C. Lynch, U.S.A. 150 pages, 5 by 7 ins., 19 plates. Paper cover. P. Blakiston's Son and Co., Philadelphia, Pa. 50 cents.

GOVERNMENT OWNERSHIP OF RAILWAYS.—By S. O. Dunn, Editor Railway Age Gazette. 400 pages, 5 by 7½ ins. Cloth. D. Appleton & Co., New York. \$1.50 net, \$1.62 post paid.

This is a comprehensive discussion of the desirability of government ownership of railways under different political and economic conditions, and especially of the desirability of government ownership of railways under the political and economic conditions existing in the United States. It

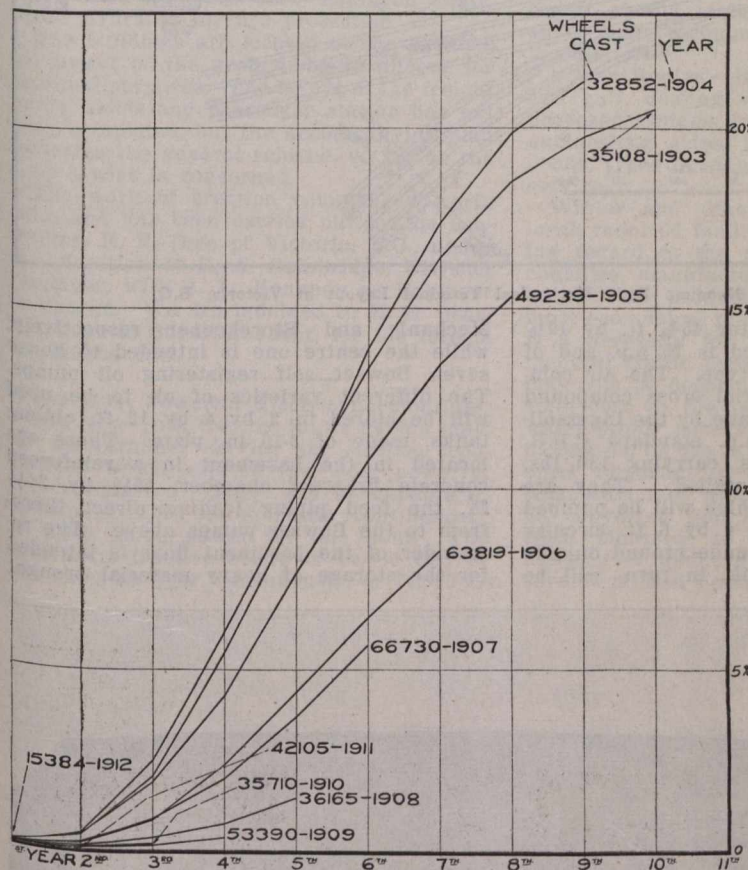


Fig. 11.—C.P.R. Wheels Removed on Account of Worn Flange.

great improvement.

The C. P. R. practice has during the past few years run to a hard wheel, the rule being to use the M. C. B. limits for depth of chill, applying them to the pure white iron only. This was introduced on account of an investigation made of a number of wheels causing derailments on account of broken flanges, which showed that the majority were soft wheels, having 3-8 in. or less depth of chill. It would certainly appear that a light chill is a cause of weakness, not only in the tread under heavy loads, but in the flanges. This may be explained by the structure being that of a hard rigid surface joined to a softer and less rigid back. Grey iron while often considered as a rigid material has only about 50 to 60% of the rigidity of the white iron, which probably corresponds closely to that of hardened steel. When this compound structure is subjected to any force, placing a tensile strain on the surface, this strain is largely localized on the layer of white iron, the

even now most economical and satisfactory in most respects. Flanges practically never break through the line in which they are restricted in strength, and until they do so, there is every reason to hope that the cast wheel may be able to hold its own, and in time to render the good service it has in the past.

The foregoing paper was read before the Canadian Railway Club in Montreal recently.

Where tube lengths of 12 or 14 ft. were common 14 or 15 years ago, lengths of 20, 22 and even 24 ft. are used in present day practice, with the result that smokebox temperatures have decreased from about 750 to 800 degrees, to 550 to 600 degrees, the only increase of energy required being the slightly greater draft in the smokebox to pull the smoke through the longer tubes.

The maximum rate of combustion per sq. ft. of grate area per hour for bituminous coal of good quality is 120 lbs., and for hard coal, from 55 to 70 lbs.

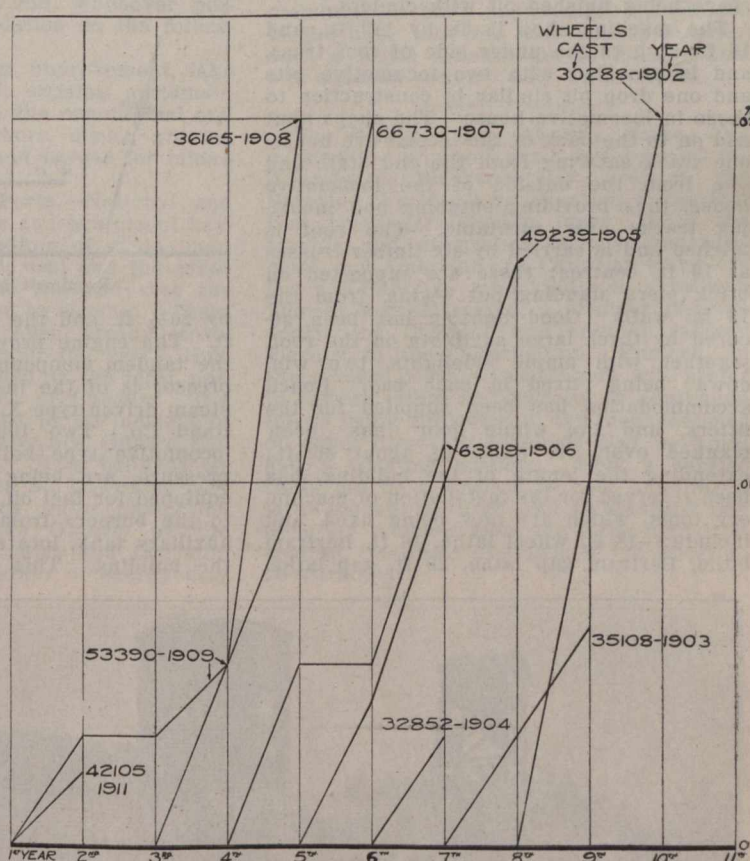


Fig. 14.—C.P.R. Wheels Removed on Account of Broken Wheel.

gives concisely the history of the relations between railways and the state in the leading countries, and outlines the causes which have led to the adoption of government ownership where it now prevails. It then discusses the following points: The relative economy and efficiency of public and private ownership and management. The adequacy, quality and safety of the transportation service rendered by railways under the two policies. The policies followed and the results of ratemaking under public and private management. The financial results to the public of state ownership. The effects of public ownership on the condition of labor. The political effects of government ownership. The concluding chapter summarizes the discussion in the preceding parts of the book and the conclusions reached.

The evaporative value of tubes or flues varies with the difference in length, diameter and spacing.