ment. The booster is of value if the hydrostatic lubricator has a restricted equalizing passage. If the hydrostatic lubricator is designed with the proper size equalizing passage, the booster attachment is unnecessary, as its principal function is to compensate for the restricting equalizing passage. The use of the force feed lubricator is very limited, but a number of railroads are experimenting with this type at the present time. The use of an independent feed for lubricating the cylinders is limited. It is the opinion of your committee that this is unnecessary and should be discontinued, as it is very questionable if any benefits are being derived therefrom.

The majority of railways are now using a superheat oil for the lubrication of superheater locomotives, stating that it does not carbonize and better results are obtained. It generally has been necessary to increase the valve oil allowance 20 to 25% for the superheater locomotives over the allowance for saturated locomotives of similar type and size. However, this does not apply in the same proportions to bad water districts, where superheating has reduced the foaming and eliminated water being carried over into the cylinder, in which cases no increase in oil allowance has been necessary.

Various methods have been tried for the use of graphite on superheater locomotives, but the replies received indicate the majority are not using graphite for lubricating superheater locomotives.

Trouble has been experienced with carbonization of oil in valve spools, and piston heads, this has been remedied by decreasing the amount of oxygen drawn into the cylinder, by drifting with a partially open throttle or drifting valve. The use of superheat oil will also decrease the trouble.

The application of superheaters to locomotives equipped with slide valves has been so limited, the committee does not feel warranted in discussing the system of lubrication for that type of locomotive at this time.

Vacuum relief valves are generally used, although there is some question as to what benefit, if any, results. The majority of replies received indicate that the by-pass valve is not in general use on superheater locomotives. These have only been advocated for large cylindered locomotives, to take care of the high compression in the cylinders.

A number of railways are now using, and others are experimenting with, drifting valves, either manually or automatically operated. When drifting is done with the throttle valve, on superheated locomotives, superheated steam is used. When drifting valve is used, either manually or automatically operated, saturated steam is used. Generally, no distinction is made as to size of drifting valve or steam connections between large and small locomotives in passenger and freight service, and for the sake of standardization such practice is desirable. When locomotives are not equipped with by-pass, automatic or manually operated drifting valve, or other drifting valve in the cab, the throttle should be cracked while drifting a sufficient amount to prevent the admission of air. This will decrease carbonization.

Very little experimenting has been done in the application of pyrometers to locomotives, outside of special tests, but the committee believes it is desirable to make tests from time to time to ascertain the degree of efficiency being obtained. In view of the initial cost, it is felt that portable instruments would answer the requirements, a certain number for each division, to be transferred from one locomotive to another. The pyrometers should be adjusted at regular intervals, in order to obtain accurate readings.

Some difficulty has been experienced due to superheater headers cracking, units leaking and packing melting. As a general proposition, however, the trouble has not been serious from these sources. There are no comparable data available as regards locomotive failures as between superheated and saturated locomotives. Better design or foundry practice is recommended as a remedy for the trouble with the headers and better workmanship for the units. The standard set of tools as recommended by the superheater manufacturers is recommended for adoption as standard for the care and maintenance of superheaters. At present there are a number of railways which have no printed instructions for roundhouse forces, back shop employes and enginemen on the operation and maintenance of superheater locomotives. In order that the greatest efficiency may be obtained, it is very necessary that all employes be fully conversant with these features. For the guidance of roundhouse and back shop employes, a standard practice card, embodying the instructions as recommended by the superheater manufacturers, should be issued.

A number of railways are welding all flues in the back flue sheet successfully, the welding being done with the ordinary types of welding equipment.

With the exception of one prominent railway, all railways reporting are using superheater dampers in the front end satisfactorily.

The investigation develops that a number of railways have had more cracked cylinders and saddles with superheater locomotives. They have now adopted outside steam pipes, which involved change in design of cylinders, on superheater locomotives.

Welding of Cast Steel Truck Side Frames and Bolsters.

The Master Car Builders' Association committee, W. O. Thompson, Superintendent, Rolling Stock, New York Central Lines, East of Buffalo, chairman, reported as follows:—Your committee desires to submit the following recommendations, one member of the committee dissenting.

Cast steel truck side frames must not be welded if cracks extend more than 1 in. from edge of any rib or flange.

Cast steel truck bolsters must not be welded if cracks extend more than 1½ in. from edge of rib or flange, unless bolster is reinforced at place of failure by addition of plates, either welded or riveted, to bolster.

J. T. Wallis, General Superintendent of Motive Power Pennsylvania Rd., Altoona, Pa., presented the following minority report:—I cannot concur in the report of the majority of the committee permitting welding of cast steel truck side frames and bolsters, as I consider the practice of welding cracks in these members, by either acetylene, electric or any other present known methods, unsafe, for the reason that the fractures indicate weakness in design, and the welding will not add to the strength, but introduces a condition of further weakness by improper workmanship. It is a well known fact that a large number of cast steel truck side frames and bolsters, especially the former, are failing as a result of weakness in design. Where the proper sections are used, and the design proved, these cracks do not appear. I cannot, therefore, subscribe to a practice of continuing in service such vital parts of car construction which, as evidence by fracturing, are inherently weak, or to a method of repairs which in no way strengthens the part, but, on the contrary, introduces another chance for failure, and consequently is unsafe.

Report of Committee on Safety Appliances.

The Master Car Builders' Association committee, D. R. MacBain, Superintendent Motive Power, New York Central Rd., Cleveland, Ohio, chairman, reported as follows:—From the title of this committee about the only matter that can be reported on is the progress that is being made in the equipment of freight cars with safety appliances to comply with the law, and your committee is pleased to state that in a general way, notwithstanding the strenuous conditions with which railways have had to contend, fairly satisfactory progress has been made in our efforts to comply with the requirements of the law. From information received from railways operating 2,505,159 freight cars, of which, according to reports, 1,905,929 were put in service prior to July 1, 1911, between the periods July 1, 1911, and Dec. 31, 1915 (the latest data available), 1,303,906 cars built prior to July 1, 1911, have been equipped with safety appliances, or an average of 289,757 cars per year. The actual total each year has been as follows:

Half year ended Dec. 31, 1911	37,667
Year ended Dec. 31, 1912	223,137
Year ended Dec. 31, 1913	331,846
Year ended Dec. 31, 1914	338,321
Year ended Dec. 31, 1915	372,935
	1,303,906

Of cars built prior to July 1, 1911, there remained to be equipped on Dec. 31, 1915, 681,571 cars. To complete the equipment of these cars by the time set by the Interstate Commerce Commission will require a great deal of effort on the part of the railways, especially in view of the difficulty of getting the cars home from foreign roads and the procurement of materials with which to do the work. In order to expedite the movement of cars home for this purpose, the Arbitration Committee has proposed, with the approval of the Executive Committee, the incorporation in rule 4 of the following:

"After Jan. 1, 1917, no car will be received from owner unless properly equipped with U. S. Safety Appliances or U. S. Safety Appliances Standard."

The committee feels that this matter should be given the closest attention possible, that there should be co-operation on the part of the railways to the end that on July 1, 1917, we may say to the Interstate Commerce Commission that practically all of the cars in the country have been equipped in accordance with the requirements of the law.

Air Brake Association.—The following officers were elected for the current year at the recent convention at Atlanta, Ga.: President, T. W. Dow, Erie; First Vice President, C. H. Weaver, N.Y.C. west of Buffalo; Second Vice President, C. W. Martin, Pennsylvania; Third Vice President, F. J. Barry, New York, Ontario and Western; Secretary, F. M. Nellis, Pittsburg, Pa., and Treasurer, O. Best, New York.