up to a certain concentration when foaming results. Waters high in alkali salts are, on account of the tendency to foam, unfit for boiler purpose.

TREATMENT.

There are, then, two evils that must be counteracted in a boiler water, the tendency to form scale, and the tendency to foam. The scale forming evil is remedied by the use of sodium carbonate, or as it is commonly called "soda ash." This is one of the alkali salts that exists in some waters, but it cannot exist in the same water with sulphate of lime, as the two would react to form sodium sulphate and carbonate of lime. Now, if a water containing permanent hardness, or sulphate of lime, be treated with soda ash, this same reaction takes place within the boiler, the carbonate of lime being precipitated as a mud and the sodium sulphate going into solution. The result is no scale on the flues, but the extra mud and increase in total dissolved solids aggravate the foaming trouble. A systematic and liberal use of the blow-off cock will keep down the foaming trouble in two ways; first, by removing the mud; second, by reducing the concentration of the water or total dissolved solids. It has been determined that when boiler waters contain over 200 parts per 100,000 total dissolved solids they are pretty liable to foam.

The usual practice has been to wash an engine out when it began to get dirty or show signs of foaming, but now we find that a sufficient use of the blow-off cock, especially the back water leg blow-off cock,