

thousand ton mile moved, or the auditor requires an accounting for every cent expended, so will every manager shortly demand the cost of evaporating each 1,000 pounds of boiler feed water in all stationary plants. An effort is therefore being made to obtain this comparative figure for the Company's various plants, in order to determine reasons for the variation of cost in different plants. This study generally brings to light strange errors in initial layout of earlier plants, and also reveals where steam product is being wasted. As the above mentioned unit may now be accurately and economically determined, it is possible to detect errors in former practice with their consequent wastes, and make provision for their elimination. Some of the points brought to light in this way or by periodical inspection are of material use in the laying out of new and the improving of older plants, and as the experience gained may be of interest in connection with power work, they may be referred to in a general way.

In the first place, a study must be made of the probable maximum and average load to be placed on the boilers, and in most cases experience with similar installations is the best guide. Once the boiler capacity has been fixed, the question of the number of units and size to employ must be determined. In almost all cases it is preferable to install at least two units, each with capacity for 60 per cent. of maximum load, to be carried so as to permit shutting down, except for short periods when the maximum load is being carried, one of the units being necessary for washing out, repairs, or inspection. There is no piece of apparatus in a power plant which gives better return for proper treatment than a boiler, and although initial expense may appear to be higher to obtain it, results will show that a convenient arrangement is the most economical in the end.

As the boiler load, especially in this climate, will vary greatly throughout the year, the engineer with most flexible plant, *i.e.*, that which can conveniently be operated at its greatest efficient rating, will obtain the cheapest power. One of the means of obtaining this desired result would be by having a ready way to vary the grate area of boilers, so that it will be properly proportioned to the load carried. It will be quite likely that in the near future specifications for boiler grates will demand this feature, just as they require means for varying the air opening through grates to allow of the proper proportion of air entrance for different coals.

The next important point is to instal a feed water heater of proper dimensions and in such a manner that the boiler will always receive a supply of properly heated water, for which the exhaust steam should be first available. Certain of the boiler laws in some of the States now require every plant to supply only hot water to