enough boilers to generate the necessary amount of steam without having to force your fires, the effect of which is to shorten the life of your boiler and this to at the expense of economy in fuel. It is a mistake to put in two boilers of 100 h. p. rated capacity to do 250 h. p. actual work It would pay well in the long run to put in four boilers of 100 h p. rated capacity and run with slower fires and be in a position to shut one down at any time for cleaning There is no advantage in forcing a steam boiler, look at it from any point we may, but I am well aware that it is a very hard matter to get some steam users to regard it in this light as it seems to them always a matter of dollars and cents in the first cost.

I came across a case not long ago where a man boasted to me with apparent pride that the man hole plate of his boiler had not been removed since the boiler was put in, which is some nine or ten years ago, and that he only took out the hand holes and washed out once a year. When such men as this are allowed to control steam boilers, is there any need to wonder that week after week we read in our daily papers of boiler explosions and loss of valuable lives and property? Many people think boiler explosions are purely accidental and can't be avoided , I maintain that this is a mistaken idea, and I feel sure that if all the details of these explosions were known the cause would in many cases be traced to ignorance and negligence of the common sense rules which should govern the operation of steam boilers.

From the reports of the different boiler inspection and insurance companies of this and other countries, also of districts where an Engineers License and Boiler Inspection Law are in force and faithfully carried out, it is fair to assume that these boilers which have exploded during the past year would not have done so had they been inspected.

No boiler of the horizontal tubular type should be allowed to run over a month, when generating steam for power, without washing out, and the man hole should be removed at least every three months and the fireman go inside with scraping tools and dislodge all the scale and deposit he can, afterwards taking in the hose with him and washing off tubes and shell thoroughly. It is a good thing two or three days before washing out to pump into the boiler 10 or 12 lbs. of sal. soda, as this will soften the scale and make it much more easy to remove.

In case a boiler is badly scaled I have found the following a good course to pursue. when a boiler can be laid off for a few days, put in from 20 to 50 lbs. (according to state of boiler) of caustic soda and get up 60 lbs. pressure of steam, and keep it up for a day, then let steam down but keep enough fire going to keep boiler hot and water at 212⅔ F. for a few days. Then let boiler cool down, let off water and wash with hose under good pressure, and repeat the dose if necessary. This treatment has been found to clean a boiler when everything else has failed. Some engineers are in the habit of blowing off a boiler under steam pressure and turning on the cold water to wash out while hot, as they claim by so doing it takes off the scale. That it does so is no doubt a fact, as the sudden contraction of the plates is so rapid that the scale is cracked and falls off. In following such a course a man may get off some of the scale, but the damage done to the boiler from such sudden contraction is such that it soon means a bill from the boiler shop for repairs.

The proper way to wash out a boiler is to let both boiler and brick-work cool down, if possible, then run off the water, and open up hand-holes, when the mud and sediment will be found in the bottom of shell and can be easily removed. After filling up the boiler with cold water put a slow fire under it and gradually warm it up. Forcing a heavy fire under a boiler full of cold water is as bad or worse than blowing off under pressure and washing out hot, and the engineer who boasts of having got up 20 lbs. of steam from water at 45 ⅔ F. in 20 minutes, only shows his own ignorance.

Every man who has charge of steam boilers should take a pride in keeping them, and everything in connection with them, clean and in good order. He should be cool and collected in case of an accident, and not like a man I knew of a short time ago, who took a situation to run a small engine and boiler and when the second day, the guage glass broke, put for the street and could not be induced to go back until the engineer from the next door had been in and shut off the valves communicating with the boiler. Never allow any oil to enter your boiler. I am aware that many engineers believe that a little cylinder oil in a boiler is a preventative against scale, but be this as it may (and I am not prepared to contradict it), it is a well known fact to many engineers that very serious damage has been done to boilers by reason of oil mixing with the impurities held in the water and forming a kind of paste which in some cases has fallen to the bottom of boiler and remained there, and owing to the fact that this oily paste has kept the water from taking the heat from the plate, the result has been that the plate has been heated to such a temperature that the pressure has bulged the plate down, and in some cases a fracture has taken place. Some engineers will tell you they have allowed the oil from the condensation of exhaust steam to be returned to the boiler for years without any harm to the boiler, but I could tell you of places where it was only allowed to go in three months or so and the result was overheating of sheets, and when the sheets were cut out the oil and mud was found thick on the water side of sheet. The best cure for anything is prevention, and if the oil is being returned in condensation from your exhaust heating system to to your boiler, my advice is to take means to prevent it at once, or if you neglect to do so you may have trouble. It is a pleasure to go into boiler rooms where cleanliness is observed, not only on the brass mountings and fronts, but up over the tops of boilers, which in too many places serve as a lumber room for pipes, bricks, old bags and a large quantity of dust. A boiler should be kept as clean upon top as in front, and it is a very small matter to keep it so when once it has been put in that condition. The plea which is so often put forth by engineers as an excuse for a dirty, slovenly engine and boiler room, "*Oh, if it suits the boss it will suit me*," is about played out. The men who get on well are those who take an interest in all they do, are clean and tidy about their engine rooms, and put in their spare time reading and studying, in order that they may keep up to the times and be in a position to take advantage of a better position when it offers itself. It is this style of man who gets there every time.

This Association has been the means, both directly and indirectly, of bettering the positions of a good many engineers, and in so doing has been a benefit to quite a number of steam users, but I do not consider that the latter have given us that consideration and support which we were entitled to. Nevertheless we are gaining in this respect steadily, and shall continue to do so as long as our organization is based on a principle which recognizes the identity of interest between employer and employee, and the belief that true merit will bring its reward in the shape of good wages without the intervention of strikes and the misery which follows them, and which we in Canada are fortunately free from in their worst form.

Mr President, officers and brethren, I thank you now for your kind attention to the reading of the paper. I only wish I had the ability to handle the subject better. I trust that in the future several papers will be read each year, on subjects interesting to us all as engineers, as such papers cannot fail to be instructive, and will tend to prove to our fellow citizens and employers especially that we are endeavoring to keep up with the procession and to advance the cause of steam engineering.

PERSONAL.

Miss Yule, daughter of Mr John Yule manager of the Guelph Electric Light Co., left home on the 24th of October to spend a year with friends in Scotland. Her companions in the office of the company presented her with a kindly worded address and a valuable field glass as a parting token of their esteem.

Invitations have been issued for the wedding on the 7th inst. of Miss Emily Selina Ryan, of Newport, R. I., and Mr. John Carroll, Secretary-Treasurer of the Eugene Phillips Electrical Works, Montreal, and 2nd Vice-President of the Canadian Electrical Association. The joyous event will take place at the residence of the bride's mother, 13 Bath Road, Newport. Taking it for granted that the bride is as charming as our fancy paints her, and knowing as we do the many excellent qualities of the groom, we extend to both our best wishes. Now that their days of "sparking" are over, may the future "current" of their lives flow smoothly and pleasantly on till the "circuit" of existence shall close.

The supreme court of Michigan has decided that a street car company which is not obliged by law to give transfer tickets, and which does not represent to the public that it will do so, may make its transfer tickets conditional upon being used within 15 minutes after being given.