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OFFICIAL PROCEEDINGS FOR APRIL, 1915

CONTAINS:—

REPORT OF APRIL MEETING

AND

PAPER ON "GENERAL BOILER REPAIRS"

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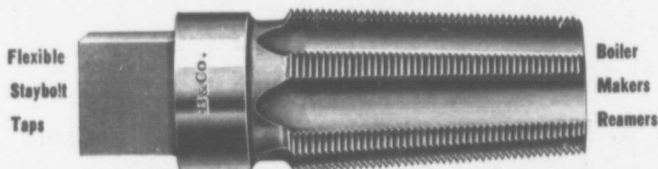
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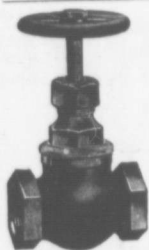
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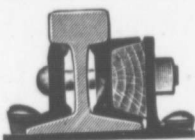
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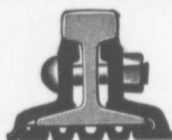
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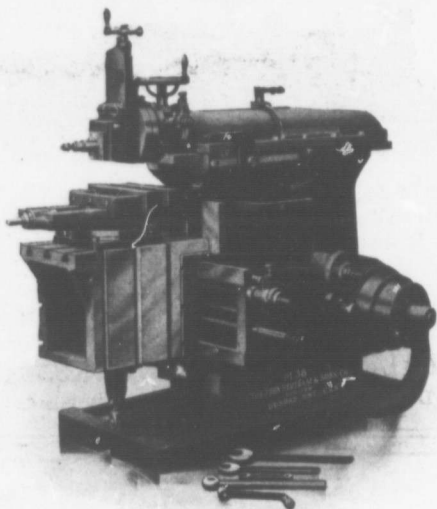
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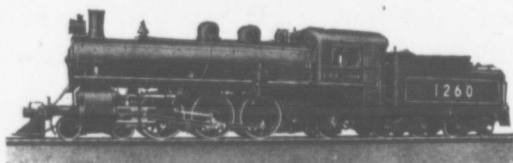
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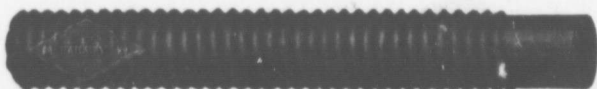
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OF CANADA

OFFICIAL PROCEEDINGS

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MEETING OF THE CENTRAL RAILWAY AND
ENGINEERING CLUB OF CANADA

COMMITTEE ROOM, HOTEL CARLS-RITE,

TORONTO, Tuesday, April 27th, 1915.

The President, Mr. Jas. Wright, occupied the chair.

Chairman,—

Gentlemen, we will now open our meeting. The first order of business is the reading of the minutes of the previous meeting. You have all had a copy of these minutes, and it will be in order for some one to move that they be adopted as read.

Moved by Mr. A. M. Wickens, seconded by Mr. G. D. Bly, that the minutes of the previous meeting be adopted. Carried.

Chairman,—

At the next meeting, which will be the last until the fall session, Mr. G. D. Bly, Chief Engineer of the Monarch Supply Company, will read a paper on "Economical Consumption of Fuel." This meeting will be held May 26th.

I would like to say a few words in regard to the picnic. In years gone by, as you are all aware, we have always had a picnic.

On account of conditions this year, in the near future a meeting of the Executive will be held to consider the advisability of allowing the Members to bring their wives with them to the picnic, as by making this step it is thought we would secure better patronage. The secretary will advise the members of the Executive in the near future when this meeting will be held.

MEMBERS PRESENT

J. Barker	A. M. Wickens	Jas. Wright
N. Quesnel	Jas. Reid	J. H. Stortz
A. J. Nightingale	Jas. Kelly	C. D. Scott
G. D. Bly	Thos. J. Walsh	W. S. Cowan
F. Smith	J. M. Clements	G. S. Browne
W. Dennett	Jas. Douglas	A. R. Taylor
T. Graham	Geo. H. Boyd	S. L. Pearson
T. B. Cole	John Egan	J. Callanan
C. H. De Grouchy	W. R. McRae	J. Dódds
W. Evans	E. Logan	W. C. Sealy
J. W. McLintock	G. Baldwin.	

Chairman,—

I have much pleasure in calling upon Mr. Quesnel who will read us the paper for the evening.

GENERAL BOILER REPAIRS

BY MR. NICHOLAS QUESNEL

of The Boiler Inspection and Insurance Company

Gentlemen,—

May I express my appreciation of the privilege afforded me to-night of addressing you on a subject with which many of you are possibly conversant. Fortunately for you, time will not permit of my dealing with the subject of boiler repairs at great length, and I only propose to touch upon such repairs as are frequently found to be necessary in nearly all steam plants.

Many of these repairs, if not properly made, may affect the strength of the boiler structure and render the boiler, in course of time, unsafe to operate at a pressure that would be useful to its owner. It is therefore desirable that every engineer should have some knowledge of the proper repairs to be made to a boiler as well as of the method that should be adopted in making them and that he should in addition, understand if, and to what extent, those repairs will affect the strength of the boiler. Such knowledge will ensure any necessary repairs being properly made at a minimum of time and expense, matters of considerable importance to the boiler owner. Indeed I might go further and say that it should be the aim of all of us to acquire such a knowledge of the details of *all* questions connected with our profession and to show such an ability to apply that knowledge as will force upon the public a better recognition of the important position occupied by the engineering profession in the industrial world.

This means in the first place that every engineer should make himself conversant with the construction and method of operating the various types of boilers in use to-day, namely, the horizontal tubular, vertical, locomotive, marine and water tube. Combine with this a knowledge of repairing boilers, and the engineer is capable, not only of superintending any repairs to the boiler or boilers in his charge, but, in many cases, of actually making the repairs himself. And conditions in boiler shops have so changed of recent years as to make such a qualification most essential.

In the past, when repairs were required on a boiler, the engineer would report same to the office. A boiler maker would be sent for and do the necessary work of repairs without any conference with the engineer regarding same, the engineer's duty being merely confined to signing the time-card when the job was completed. The present methods of constructing boilers differ so greatly from those of the past that the boiler-maker of to-day only has to possess a knowledge of his own part in it and need not, and often does not, have the general knowledge of the construction of all parts of the boiler that the boilermaker of the past *had* to have. For example, the layer-out, the flange-turner and fitter-up do nothing else but attend to their special duties. The boilermaker in the true sense of the word is becoming a rarity and his services are not only hard to obtain but are at a premium. Surely this emphasizes the importance of every engineer studying and becoming familiar with the work of repairing boilers.

This work we will now consider under its different heads.

REPAIRS TO TUBES

In former times after tubes were placed in the boiler, they were expanded, then beaded, and afterwards rolled very lightly to tighten them up, this work being all done by hand, and boilers can be found to-day, with the same tubes that were put in them twenty-five and thirty years ago, absolutely sound and in good condition. The work of tubing is now almost altogether done with pneumatic tools, with the result that the man on the work does not always know or realize when a tube is sufficiently expanded. The tube material is soft, yielding quickly to the action of the machine and the point where the tube becomes tight to the sheet, may be easily passed. It is important to remember that tubes should be rolled just enough to make them tight to the sheet. They should then be beaded. If after this is done, the application of the water test reveals leakage, it is only necessary to expand them very lightly. This leaves the full strength of the material where it is needed and if at some future time the tubes are found to be leaking, there is still enough material left in them to farther expand them and if necessary re-bead them.

Particular attention should be paid to the beading, especially in those types of boilers where the tube ends are exposed to the action of the fire.

Tubes that are too thin to expand and on which the beading is broken should be at once removed and replaced with new ones.

RIVETTING

This is part of the work in repairing a boiler, the importance of which must not be underestimated. Hand rivetting on boiler work and particularly on repair work may almost be called a science. The holes should be fair, the outer plate counter sunk sufficiently narrow and deep to obtain the greatest strength in the rivet after it is driven up, and the bat left slightly full so as to permit of caulking rivet round the edges leaving as little exposed to the action of the fire as possible. Inattention to these details will frequently result in rivets leaking, causing much trouble and annoyance to the man in charge of boiler, to say nothing of additional expense.

The use of the drift pin should be avoided as much as possible. Too much drifting often results in the plate cracking from rivet hole to edge of sheet, or from rivet hole to rivet hole. This naturally weakens the plate, a weakness that in course of time may become dangerous. The Ontario Regulations point out that while the drift pin may be used with light hammers to draw the plates into position, they must not be driven with such force as to disturb the metal about the hole. Where holes are not fair it is far preferable to ream them than to use the drift pin.

Re-rivetting may frequently obviate the necessity of patching, particularly in boilers where the girth seam is in direct contact with the fire causing constant leakage and cracked sheets. Provided the cracks are not too serious, the old rivets may be drilled out, the holes counter sunk and reamed fair and new rivets driven up and caulked. In removing old rivets the drill, and not the sledge and set, should be used.

CAULKING

Great care should be taken in the choice of the tool used to do this work properly. The tool generally used is known as a fuller, which is round on the point, different sizes being used for various thicknesses of plate. Occasionally boilers are found that have been caulked with a square tool. While the latter tool may make a tight job its use has not been found as advantageous as that of the fuller for the reason that it causes the joint to open up ahead of where the tool is applied, making it necessary to recaulk the entire circumferential or longitudinal seam. The use of the fuller on the other hand only makes it necessary to recaulk a little more than the part of the seam actually leaking.

The size of the fuller to be used is important. It should be of sufficient thickness to bring the plates properly together. Too light a fuller will cause a parting or springing of the plates.

PATCHING

This is the most important part of the work done in connection with boiler repairs, the method of working depending upon the type of boiler.

In horizontal tubular boilers, marine boilers and some vertical boilers patches are almost always rivetted. On locomotive work and in small vertical boilers, what is known as patch bolt work must frequently be resorted to. Rivetting, however, has been proved to give better and more lasting results, particularly where the patch is to be exposed to the heat of the fire, and this method of patching should, wherever possible, be followed.

Patches should be made to conform as near as possible to the shape of the old material, so that the old and new plates may be brought properly together without causing any undue strain upon the former. The patch should be fitted good and close before the holes are drilled. The holes should then be drilled through and counter sunk as previously described, no oil to be used in drilling if possible. Where oil is used all traces of it should be carefully removed. The patch should then be removed and all burrs and scale cleared off, so as to ensure perfect contact of plates or material. Where a patch is at a joint or seam the material must be scurfed down and carried back far enough to cause as little of it to be exposed to the action of the fire as possible.

Then bolt patch in place, hammer lightly, tighten up bolts and make ready to rivet. In cold weather plates should be warmed sufficiently to make them pliable.

Great care should be taken to allow no more lap than is actually necessary, either inside or outside. The proper lap should correspond with the diameter of the rivet hole, the centre of the rivet hole being one and one half times its diameter from the edge of the plate. Too much landing on the plate exposed to the fire will cause it to spring and leak.

Where a sheet or a half sheet is to be placed on a boiler the rivetting of the longitudinal seams should in all respects conform to the original rivetting in order that the original strength of the boiler and the pressure at which it has been used should not be affected. A single rivetted joint on a new sheet or half sheet of a boiler, the longitudinal seam of which is double rivetted, will make it necessary to cut down the pressure on the boiler in order to make it conform to the strength of the single rivetted joint. This is one point that engineers should carefully observe.

POCKETS OR BULGES

One of the most frequent causes of trouble to the engineer is the formation of pockets. These are generally caused, as you are all aware, by the deposit of mud or oil on the bottom sheet of the boiler. There are two ways of dealing with a pocket. If it is not down far enough to have stretched the plate to a point near to or beyond its limit of elasticity, it can be driven back without its affecting the strength of the plate to such an extent as to necessitate a decrease in pressure.

To do this properly the plate should be evenly heated with a large torch, or small fire of charcoal and coke in an iron pail, care being taken not to overheat the plate, after which the pocket should be hammered up lightly beginning round the outer edge of the bulge and gradually working in towards the centre. The heating and hammering should be repeated until the bulge is completely straightened out to curvature of shell.

If, however, the pocket has come down so far as to overstretch the plate, it should be removed at once and a patch put on. If such a pocket or bulge is close to the heads or girth seams the bulge should be put back as above described before the plate is cut and the rivets disturbed. This will not only prevent the rivet holes drawing, but will make it very much easier to remove the rivets.

Where a pocket should be removed, but it is impossible to at once shut down a boiler for a sufficient time to allow the repairs to be made, the pocket can be put back as first described and where the plate is thin in the centre it should be driven up a trifle so as to form a corrugation and thus give a little additional strength to the weak spot.

In horizontal tubular boilers of large size, the plates of which exceed three-eighths inch in thickness, patches on the furnace sheet are undesirable for the reason that the thickness of the material forming the joint is almost sure to cause constant leakage and trouble. Where repairs are necessary to the furnace sheet, on account of a bulge or pocket or other defect in such boilers it is almost always preferable to put on a half sheet.

CRACKS IN FURNACES

Cracks occasionally occur on the bottom of horizontal tubular boilers. The proper way to repair this defect is to stitch them. This is done by putting in small plugs of soft iron three-eighths inch or one-half inch diameter along the crack. The plate should be drilled so as to clear the end of the crack and the first plug put in. Then the plate should be drilled so that each plug put in afterwards should interlace

the preceding plug, the drilling and plugging being continued until the whole of the crack is drilled out. If properly done these repairs will last for years without any leaking.

May I refer briefly to the advantages of periodical inspection. By this I do not only mean inspection by those engaged in the business of what is known as boiler inspection and insurance but inspection by those in charge of the boilers themselves as well. Such inspections will frequently render the repairs with which I have dealt, unnecessary, resulting in a saving of time and expense.

In conclusion, it will not, I feel, be amiss to point out, in connection with the question of boiler repairs, that the three essential factors which determine the safety of a boiler, must at all times and on all occasions be borne in mind by the engineer. These factors are:—

1. Its original construction and equipment, which can be materially affected by repairs.

2. The proper maintenance and working of the boiler and its fittings, with which the question of repairs is, of course, connected.

3. The regular inspection of the boiler and its appurtenances, which often obviates the necessity of repairs.

If there are any who would care to ask any questions, and I can answer you or give you any information, I will only be too pleased to do so.

Chairman,—

Gentlemen: It is your privilege now to catechize Mr. Quesnel.

I am sure we have some gentlemen here this evening, who have boiler plants under their charge, and could, no doubt, propound some questions which would keep us all interested for awhile.

Mr. T. B. Cole,—

In tapping or drilling bolt holes in boiler plates, why is it not considered advisable to use any oil?

Mr. Quesnel,—

You will not experience any difficulty in tapping with oil, but not so when drilling.

The trouble here can very well be illustrated by telling you of a case with which I was in touch a short time ago.

I was called upon to inspect a new vertical boiler, which had only been in use about a week. Immediately inside of the door frame on the right side of the boiler, a bulge had developed;

this was in the stiffest part of the boiler, where you would be least liable to expect anything of the kind. After investigating we found that the cause of the trouble was, that the man who had done the drilling of the boiler, used the method adopted in a good many of the shops, that is, cut plate out before the fire box was rivetted to the shell, rivet right through in the mud ring and then cut it out. The new method is to cut them out first. In this case the boilermaker had neither removed the oil or the waste from the sheet, and this of course had the tendency to drive the water away from that section of the plate, as you will readily understand.

About a month ago, I saw a boilermaker drilling holes on the top of a boiler, and he was using as much oil in drilling one hole as a man who knew his business would use for drilling all the holes in the boiler.

It is always considered preferable, and you will find that the general practice is to use a soda and water solution, exclusively.

Mr. T. J. Walsh,—

I have not very much to say. The paper covers the subject very clearly.

The only thing I can say is that everything which Mr. Quesnel has said regarding the repairs and inspection of boilers seems to me to be absolutely true. There is no question about that at all. If you follow out the instructions that are laid down in his paper no mistakes will be made.

Mr. Quesnel,—

I notice that a great percentage of the members that are here to-night have the appearance that would lead me to believe that they are old-timers, like myself.

The idea that we have to-day is to educate the young man that is coming up in the engineering fraternity; endeavour to get him interested in his profession. Get him interested and you will find that he is anxious to learn.

There is a very discouraging point in the trade of stationary engineer that a young man will often call your attention to. A young fellow takes up the trade thoroughly for, say five years, and at the end of that time is awarded a certificate, and if he has taken advantage of his opportunities is competent to take charge of a plant. Another fellow will fire for two or three years, sometimes less than that, and in some unaccountable manner secure a certificate and be placed in charge of a plant on a level with the chap who has taken up the trade thoroughly, and will if he is ordinarily intelligent be able to fulfill his ordinary daily duties. We should make it our duty

to impress upon the young man, that even though this may be so, his ability will sooner or later become known to some one who will take an interest in him and place him in line for promotion.

I believe that the engineering profession to-day is one that should be looked up to. You have only got to think of the great amount of responsibility which rests upon the engineer's shoulders.

I always think it is a good thing to get together with the young men and talk over engineering questions with them, and let them see that there is something in it for them.

If you do that you will find you will be making engineers, and not have it said that the engineers of to-day are not what they were in the years gone by, but have them say, "the engineer of to-day is farther ahead in his profession than ever before."

Mr. A. M. Wickens,—

I am sure that Mr. Quesnel's paper has been very interesting to us all. While there is no doubt that the paper has covered the subject very fully, perhaps there are one or two things in connection with it that we might discuss to the mutual benefit of all here, not with the idea of finding fault with the paper by any means.

Mr. Quesnel tells us in his paper that the engineer should as far as possible make his own periodical inspections. Now there is no question but that this is right, providing the engineer in charge of the plant is an engineer.

We have a License Law in the Province of Ontario, and a Boiler Inspection Law under the Factories Act. The Boiler Inspection Law reads "that every boiler used for manufacturing purposes in a factory must be inspected once per year by some competent person." It goes on further to say that the competent person is some one who has had five years experience as an engineer, but in another part of the law, it is found specified that the competent person is any one who holds an engineer's certificate, which can be procured after two years experience. I think there is a mistake there. Mr. Quesnel is perfectly right in his statement in this respect, providing that the man is actually an engineer, in the full sense of the word.

If an engineer is to direct just what work is required to repair his boiler, and how it is to be done, he has got to be more than a man with a two year's certificate—he has got to be more than an ordinarily competent engineer—he has got to be a reader and a thinker.

I, like Mr. Quesnel, have been inspecting boilers for many

years, and it is my firm belief that the average boilermaker knows how to do his work, but he does not know, quite frequently, just why certain steps are required of him; just why it is insisted that he do this and that. He learns to drive rivets and caulk joints, but does not learn anything about the strength of the material. Then you will sometimes find that the boilermaker could do a piece of work very well by hand and on his own initiative when the engineer could not tell him what was required to be done. I mean here, the older man who served his time before the shop work was specialized.

Take, for instance, a case where a boiler requires a new half sheet, which is one of the most common of the various natures of repairs required—this is entirely foreign to locomotive or railroad work; I am speaking now of stationary boilers—the boilermaker comes along and says, “we should have a new half sheet here.” This boilermaker is a fellow just filled with confidence in himself, and he is the fellow that knows in this particular case. “The thickness of this plate” he says, “is 7/16”; I do not like putting on a patch 7/16” in thickness. We will apply a 3/8” patch.” But, the 3/8” material is not as strong as the 7/16” plate by nearly 20 per cent. The rivets will not be the same as the original. The work is done, notwithstanding the fact that there is from 30 per cent. to 40 per cent. reduction in the strength of the boiler.

Presently the insurance inspector comes along and lets them know that he is there; in other words draws their attention to the fact that the patch is not satisfactory. “Why,” they say, “we have just had the boiler repaired by the most competent boilermaker in this city.” But that does not go; the most competent boilermaker in the city has not got a boiler insurance policy for \$10,000 behind that boiler if there is an explosion; consequently the insurance inspector must be a trained and educated man. Further, in this instance, after repairs are made to the boiler, the inspector will say, “a safe pressure for this boiler was formerly 115 pounds. We cannot allow more than 90 pounds now.” “But,” the owner says, “we cannot run our plant on 90 pounds.” If he happens to be a trifle mercenary, he will continue to run that boiler at the former pressure, 115 pounds, saying, “oh! we’ll take a chance on it. The insurance company refuses to carry it at 115 pounds. An explosion takes place. The coroner, who is probably a doctor, at the investigation comes to the conclusion that the cause was “low water.” The cause was no such thing, but was due to operating the boiler at too high pressure.

I could stand here for two hours and cite cases where the average boilermaker did something that was entirely wrong and did not know it. What is the chief engineer going to

do?—a man that is in charge of a good size plant, and can use all the information he can obtain. Let him get two or three mechanical papers a year, at a cost of \$1.00 each, and from them he will get a mass of useful information which he can apply to his daily work. Let him join engineering clubs, and I know of none better than this one; there is no place where you will get more useful mechanical information than at these meetings. They have always been a source of education for me. There is no excuse for an engineer not going ahead, and keeping abreast of modern practice in these days when information and special knowledge is so easy to obtain.

Mr. Quesnel,—

I am glad Mr. Wickens mentioned the point regarding the periodical inspection by the engineer. What I meant in my remarks in this respect was this: the law to-day reads "that every boiler must be inspected once per year by some competent person." Mr. Wickens explained to you what is meant by "competent person." Very good! I do not care if the Government calls for an inspection every four months. If I was an engineer in charge of a plant, I would feel that it was my duty, for my own protection, to go into that boiler myself at every opportunity and see that it was all right. The law says that an inspection is to be made once a year; there are a lot of things that can happen in a year, and that is the reason I say that periodical inspection should be made by the man in charge. The man who can obtain an engineer's certificate should certainly be able to tell whether the stays are taut, to see that the boiler is free from an accumulation of scale and whether any leakage or corrosion is taking place.

I believe that the annual inspection required by the government is all right. There is no fault to be found with it. But, nevertheless, the engineer who takes an interest in his work will certainly feel a desire to make his own inspections whenever the opportunity presents itself. The most competent man is liable to pass over something; no man is infallible, and the "competent man" making the annual inspection may inadvertently overlook something which the engineer in his inspection might detect. The man is not incompetent because he overlooked some little defect. It is just possible that the inspection, as frequently is the case, was made in a hurry. Allowances must be made for these things.

I am glad that Mr. Wickens raised this point.

Mr. A. R. Taylor,

I quite agree with Mr. Wickens that some engineers do

not, and cannot be expected to know boiler work, with their short experience.

Mr. Quesnel, you spoke about the subdivision of labour in boiler making and you expect an engineer to be competent to know what should be done to a boiler when something goes wrong. Mr. Wickens starts off and says we can get papers or books and read a whole lot. Where can I get a paper that will tell me how to know when the tubes of a boiler are brittle?

Surely the average engineer is not competent to tell a boilermaker, who has spent a lifetime at one particular branch of the trade, what he should or should not do. You see the point I want to make is this: if you subdivide the labour, you are sure to make the men more competent in their own particular branch, and in this way, the boilermaker should know more than the engineer knows about the boiler-making trade. You cannot get away from the fact that there are some branches of the trade that an engineer cannot cover. The engineer, however, should be able to tell the boilermaker that the rivets should be so far away from the seam and so far apart, but you have got to have a boiler inspector to go over that work again and tell you where you are getting off at. The average engineer should, however, as Mr. Quesnel states, go into the boiler and see if the rivets and stays are taut, if there is an accumulation of scale, or if there is leakage or corrosion, and give the boilermaker an idea of where his work lies.

It is my contention that the engineer would be overstepping himself in telling an experienced boilermaker just what he wanted done, and how he, the boilermaker, was to go at it. I therefore cannot help saying that this subdivision of labour you speak about does not seem to me to be any better than the old way.

Mr. N. Quesnel,—

If I understand you correctly, you think that the engineer would not be doing justice to a boilermaker's ability by telling him what to do.

Twenty-nine years ago, I went to serve my time as a boilermaker with one of the best boilermakers that this country ever produced, John Mains. I had to work a certain period at every branch of the trade, and the result was that I had, when I was out of my time, a thorough knowledge of the trade. Nowadays in an up-to-date shop, the system is this: that the boiler-making trade of to-day is specialized in different branches.

I will guarantee that I can go into almost any ordinary boiler in the city of Toronto to-day, take out the tubes and roll every one of them. This is the reason that I say that the man that is in the plant all of his time should know the con-

ditions that exists in the boiler, what causes the leakage, if any, and he should have an idea what should be done.

A short time ago a case came to my attention where a man had undertaken to repair a boiler for \$118.00. The people who owned the boiler felt that they would like to have it examined by an inspector while the tubes were out,

There was an old fellow working around it, he was supposed to be a boilermaker. I said to him, "that firebox looks pretty bad." "Oh!" he said, "I guess it's all right." I changed my clothes, got into the boiler, and took a small hammer, about the size that a woman would use to tack down a carpet, struck a moderately sharp blow in one spot, and the hammer went right through. Struck two other spots, with the same result. The man who had taken the contract for repairing this boiler had not taken the trouble to make any examination of this section of the boiler whatever, thus putting himself to all this trouble for nothing, as the boiler could certainly not be repaired at a warrantable cost. A new firebox could have been applied, but after making the other repairs as well, when the government man had come in and made allowances for everything, the pressure certainly comes down.

As a matter of fact, I do not know whether they had an engineer in charge of that boiler, that is, a qualified engineer, but the man who was operating same certainly should have been aware of the conditions existing. I do not say that there are no competent boilermakers now, but they do not appear to be educating boys to that trade. Superheated steam is coming into use, and this with a number of other things, in my opinion, is going to place the boilermakers of the future at a premium.

Mr. A. R. Taylor,—

You did not cover the point I was trying to get at. Take a man who has served his time as a boilermaker. If he came to my plant to make some repairs to the boiler, and I started to tell him how this and that should be done, what would he be liable to say to me, knowing that I was an engineer and not a boilermaker by trade.

Mr. Quesnel,—

I thought I had covered that, but now look at it this way.

When a man comes into your plant to repair the boiler, you, as a competent engineer, can tell in a few minutes whether he is a mechanic or not from the way he handles his tools. If he goes at the job the way some plumbers go at a piece of work, then you certainly should interfere.

Mr. G. D. Bly,—

There has been a great deal said along the line of an engineer being a boilermaker, etc. The trouble is that there are too many men who are engineers merely by chance and not by ability. A few weeks ago I was in a plant and happened to get in conversation with the man in charge, and he frankly admitted to me that although he had an engineer's certificate he was not an engineer, but was a steamfitter by trade. He had helped to do some work on the plant, and the manager had offered him the position.

I believe that the manufacturers are responsible for the conditions that exist to-day in this respect. I know of buildings, not a stone's throw from here, where the shippers are running the boilers.

Further in this respect; there is the Technical School in this city where they claim to give an education in mechanical engineering. A short time ago they advertised for a man to take charge of the engine room at the magnificent salary of \$1,200 a year. Is that not ridiculous?

I think the paper has been appreciated by all, and I hope that we have more such papers in the future.

Chairman,—

I do not know as regards to the engineer being a man that requires to be educated.

When our own public journals in Toronto will carry an advertisement like the following, I do not wonder that such conditions as you gentlemen mention are existing:

"WANTED: AN ENGINEER, MUST HAVE A CERTIFICATE. WE WILL PAY \$10.00 PER WEEK."

This advertisement appeared in one of our Toronto dailies for three nights. I hope the man that inserted this advertisement has to sit on the safety valve when the boiler blows up.

The engineering profession to-day is, as Mr. Quesnel says, one in which you have got to get away from the old land marks that have been followed in the past.

How is it that a man can get a stationary engineer's certificate that can neither read nor write? I can prove what I say, that there are two or three men in this city with stationary engineer's certificates who could not write their own names if you asked them.

Mr. F. Smith,—

I think I can explain that to you. If you cannot write they will furnish a man who will write the answers to the questions for you, at your dictation.

Mr. J. Callanan,—

I think it is mighty fine of Mr. Quesnel to encourage the young man coming up.

I have learned a great many things from the inspectors and old boilermakers. In fact, I believe that more information can be obtained in a conversation with one of the old-timers than from any other source, unless it be engineering books, which is, of course, very slow.

Regarding boiler repairs; some work was required on the boiler in the plant which I have charge of. A young fellow came to do the work, and I think he must have been one of these so-called specialists, as he came twice and then did not do the job properly. Another man was sent for—one of the old school,—and he put the boiler into splendid condition. Of course, I do not claim that I can tell a boilermaker how to make all the repairs necessary as I have not the ability, but you can always get a fairly definite idea of his ability by the way he goes at the job.

Mr. J. H. Stortz,—

I happen to be connected with the railroad end of the boiler work, and as nothing has been said in this respect this evening, I could not let the opportunity pass without saying a few words. I was particularly interested in the speakers' remarks about the passing of the old-time boilermaker.

The boilermakers' trade is becoming undesirable. In our flourishing cities the young men do not care to follow boilermaking. The best inducement is more money, and we have found it necessary to continually advance boilermakers' rates. You cannot get away from this; the result is that we have got different conditions in regard to boilermaking than there were twenty years ago, which has brought about specializing the work, and the new men that we break in, and bring up in the work required to be done, give the best service.

Regarding the speakers' remarks in connection with the stationary engineer making periodical inspections of his boiler, what he says is correct: I know from my own experience that although I do not by any means claim to be a boilermaker, I can go into a boiler and tell whether it is in a satisfactory condition to be working or what repairs are necessary to be made. I had to be able to do this to make a success of my work.

Up to three years ago last January, railroads were not required to submit reports to the government for inspection of locomotive boilers. The government left this entirely in the hands of the railroads previous to this date. January, 1912, the law came into force requiring inspection reports to be sent to the

government certifying that boilers in locomotives are in perfectly satisfactory condition for operation, and I am safe in saying no railroad could operate a locomotive with a boiler that is not absolutely safe, which is, I believe, more than the stationary men can say.

A monthly inspection report has to be made to the government as well as an annual hydrostatic test report, the test being applied at 25 per cent. more than the working pressure. It would be impossible for a railroad to have a locomotive in operation with a boiler that was unsafe, as no one could be found to sign these reports, knowing them to be untruthful, those for engines running into the United States having to be sworn to before a notary public.

It might be interesting for some of the members present to know that all the Trunk Lines have discontinued the practice of rolling tubes. The system now in vogue is the prosser system, and it has been very successful; so much so in fact that that it is not now considered a venture, but rather an established system.

In regard to the patch bolt patches on fire boxes. They have always given the railroads considerable trouble. They had to be put on in many cases because it was impossible to get at the work at the time for any other kind of a patch. However, the welded patch is displacing this method now, as patches welded have been found very satisfactory, and in many cases the fit is so perfect that you could not tell that there was a patch.

Mr. F. Smith,—

I would like to ask how it is that fusible plugs are not used more extensively in this country. In the Old Country all boilers are equipped with these plugs.

Mr. N. Quesnel,—

The law now requires that all boilers have fusible plugs. No boiler can be operated to-day without one.

Mr. G. H. Boyd,—

I am sure we have all enjoyed this paper and I have great pleasure in moving that a vote of thanks be extended to Mr. Quesnel.

Mr. C. D. Scott,—

I second that motion.

Chairman,—

Gentlemen: It has been regularly moved and seconded that a vote of thanks be extended to Mr. Quesnel for the time and trouble he has taken in preparing this paper and reading same here this evening. All in favour please signify in the usual manner. Carried.

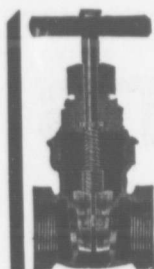
Mr. Quesnel,—

I thank you gentlemen. Some time between now and next winter, I propose to get together some lantern slides showing the different defects which develop on boilers, and how they are caused, and possibly at some future date I shall be in a position to come before you and endeavour to interest you with these.

Moved by Mr. A. M. Wickens, seconded by Mr. T. B. Cole that the meeting adjourn.

NOTICE

Owing to the Queen's Birthday falling on a Monday, and no doubt a number of the members will spend the holiday out of Toronto, it has been decided to hold the regular meeting on Wednesday, May 26th, instead of Tuesday, May 25th.



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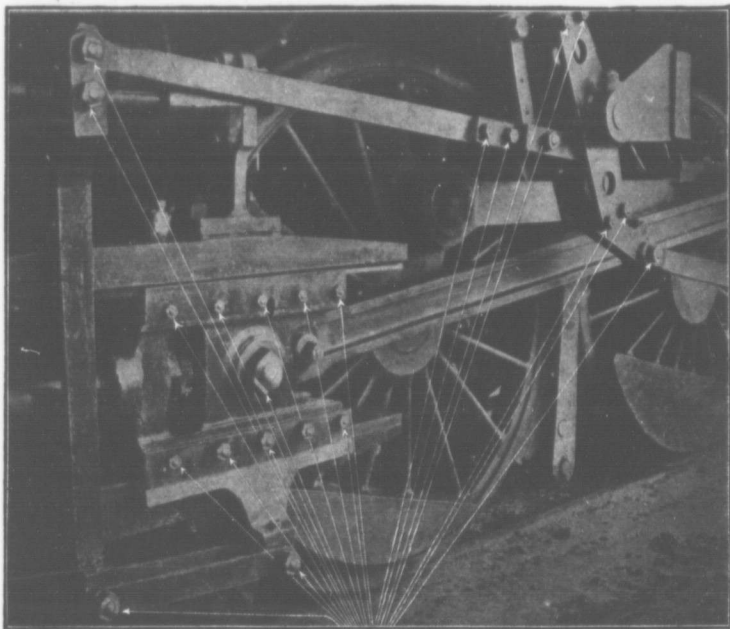
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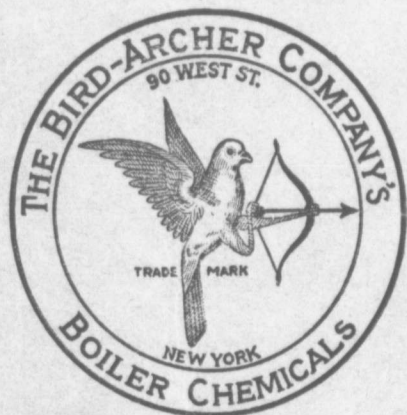
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