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No. 8

TORONTO, CANADA, NOVEMBER, 1914

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President

C. L. WORTH,
Sec-Treas.

THE CENTRAL RAILWAY AND ENGINEERING CLUB OF CANADA

OFFICIAL PROCEEDINGS FOR NOVEMBER, 1914

CONTAINS:—

REPORT OF NOVEMBER MEETING

AND

PAPER ON "OXY-ACETYLENE WELDING AND CUTTING"

For Sale

. . THE CENTRAL . . Railway and Engineering . . . . Club . . . . OF CANADA

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MEETING OF THE CENTRAL RAILWAY AND ENGINEERING CLUB OF CANADA

COMMITTEE ROOM, HOTEL CARLS-RITE,

TORONTO, November 24th, 1914.

In the absence of the president, Mr. G. Baldwin, past president, occupied the chair.

Chairman,—

Gentlemen: The time has arrived for opening our meeting. The first order of business is the reading of the minutes of the previous meeting. Everybody has had a copy of these minutes, and it will be in order for some one to move that they be adopted. Moved by Mr. A. M. Wickens, seconded by Mr. Jas. Wright, that the minutes of the previous meeting be adopted. Carried.

Chairman,—

The next order of business is the remarks of the president. I am sorry to say that our president, is unable to be with us again to-night on account of illness. I saw him last week, and I am pleased to be able to say that he is improving.

I might also say I saw our esteemed friend and member, Mr. H. G. Fletcher (whom most of you know) a few days ago, and he is gradually recovering, but very slowly.

I might also add that Mr. Fred. G. Smith, a member of our Executive Committee, has removed from Toronto and taken a position with the government in the Structural Steel Department at Ottawa.

To-night it will be necessary to appoint a Nominating Committee of five to nominate officers for the year 1915.

At the next meeting, December 22nd, a paper will be read by Mr. M. A. Humber, instructor Grand Trunk Railway, Stratford, Ont., on "Systematic Specialization of Shop Work and Method." This will be a very important and practical paper, and regardless of the fact that the next meeting is close to Christmas, there should be a good turn out of local members.

I do not know that there is anything else I can say under this heading. The next order of business is the reading of names of new members.

NEW MEMBERS

Mr. Jas. Shivers, Machinist, Grand Trunk Roundhouse, Stratford, Ont.

Mr. L. R. Arnett, Manager, Siche Gas Company, Limited, Toronto, Ont.

Mr. E. Watt, Machinist, Stephenson Blake Company, Toronto.

MEMBERS PRESENT

C. H. Stainton
Frank Allott
Geo. H. Boyd
W. J. Perry
T. B. Cole
E. A. Wilkinson
J. C. Daniel
J. W. Walker
O. W. Linn
A. W. Davis
A. Turnbull
A. R. Taylor
W. M. McRobert
Geo. Baldwin
W. Evans
J. Dodds.
G. A. Young
J. Clements
C. D. Scott
F. Flox
J. McKinney
W. Cornish
R. Muirhead
J. Douglas
E. E. Cummings
C. Royer
G. Holland
Alex. Taylor
Jas. Barker
L. R. Arnett
W. Sealy
G. C. Mooring
J. Bruce Robb
John A. Murray
Wm. S. Davis
Geo. S. Browne
C. Daniels
John Rome
A. T. Voehl
Alan Beardshaw
J. Macmillan
Jas. Wright
A. M. Wickens
J. H. Stortz
E. Logan
J. Reid

Chairman,—

Under the heading of new business, in the absence of the president, it is, I understand, the duty of the acting chairman to appoint a Nominating Committee, and if it is your wish I will select five members to act as the Nominating Committee for the selection of officers for the next year.

I will appoint the vice-president, Mr. Jas. Wright, Mr. J. B. Robb, Mr. A. W. Davis, Mr. J. D. Scott, and Mr. Geo. H. Boyd, with your permission.

The next order of business is the reading of papers and discussion thereof. To-night we have a paper on "Oxy-Acetylene Welding and Cutting," by Mr. L. R. Arnett.

I might tell you that I am intimately acquainted with Mr. Arnett, and have been for a number of years, and I am sure that you will be highly edified by the paper that he will read to us to-night.

You will notice Mr. Arnett states that he is not a technical man, so we do not wish for any technical questions to be asked. He does not claim to be a technical man, nor a chemist, but what he does claim to be is a practical man, which I feel sure you will be satisfied he is after you have heard his paper.

OXY-ACETYLENE WELDING AND CUTTING

BY L. R. ARNETT

Manager, Siche Gas Company, Limited, Toronto

Mr. Chairman and Gentlemen,—

When my good friend, George Baldwin, asked me a few months ago if I would contribute a paper on welding and cutting for your club, I told him that I was not an engineer and therefore would not be in a position to answer technical questions which might be put to me on the subject. I said my knowledge was of a purely practical nature and although I knew my subject, I did not feel capable of giving an interesting paper to engineers, Mr. Baldwin would hear none of it, and in a moment of weakness I consented, so you must blame your past-president for any disappointment you may have to endure, as I am not a chemist and do not use the much abused title, *Expert*.

THE OXYWELD PROCESS OF FUSION—WELDING AND CUTTING

The autogenous welding of metals by the oxy-acetylene blowpipe, and the cutting of steel by the oxy-acetylene cutting-torch, took too long to say, and after repeating it many times to prospective purchasers of welding and cutting plants, I grew hoarse and wanted to cut it short so coined and copyrighted in Canada, the word "oxyweld" and we now use it as *our* trademark.

The photographs which are handed you for examination were all taken in our welding-room or on jobs which we have in this city, and of which I have personal knowledge, the illustrations are from European and American firms and are from actual photographs.

The oxyweld process is the most powerful and valuable method yet discovered of dealing simply and economically with an immense variety of operations in welding and cutting and is recognized by the foremost engineers in Europe and on this continent in connection with all classes of metallurgical work where high temperatures are demanded in construction, or in salvage after destruction, and for general repairs. A few notable instances of salvage are the cutting up of the Quebec Bridge, the battleship *Maine*, and the old Don Bridge, the cutting of armor plate nine inches thick by the British Oxygen Company.

In the construction or repair of all kinds of steel, boiler plate, cast steel, cast iron, malleable, brass, bronze, copper, or aluminum, machinery or parts, the oxyweld process is saving thousands of dollars daily in Canada alone, notwithstanding the fact that there are only a few welding plants in the larger cities and towns, and not all of them run by competent welders, this has retarded the progress of the industry in this country.

A number of cheap outfits were sold regardless of whether the purchaser could make a good weld or not and the result was a general condemnation that oxy-acetylene welding was no good, the welds would not hold, and the charges were excessive, this condition is, happily, almost a thing of the past.

Perhaps some of those present have experienced the failure of parts welded improperly and if not taking up too much of your time I might here point out the essential features absolutely necessary to a good weld on different kinds of metal. I will begin with cast iron which is the most general class of work which comes to our welding department in the course of a day's run.

The welder must know how to weld, he must understand the contraction and expansion of metal, as internal strains are set up, as the parts are heated and expand, and contraction takes place as the metal cools, where the parts form restrained members of any piece of machinery or casting, the internal strains set up are often sufficient to crack the metal, therefore the operator must know how to properly champfer, clean, set up the work, and preheat the pieces to be welded, must have the proper mixture of oxygen and acetylene, the right size welding head, the best filler-rod containing the proper proportion of silicon, use plenty of good flux, and be careful not to harden the metal or leave it spongy, as it may require finishing or machining. The moment the weld is finished the part should be reheated and then immediately buried in asbestos wool and allowed to cool very slowly for several hours, in the case of auto cylinders from twelve to twenty-four hours. It is imperative that raising and lowering of temperature should be slow, and the casting kept away from air draughts in order to bring about a gradual distribution or entire dispersion of any strain. The larger the casting the more important it is to preheat and reheat, and cool slowly.

Just a word here about taking a casting that is either burned out, like a firepot of a hot water heater, or a pump section badly eaten through by corrosion. A conscientious welder who wants to hold his trade will tell his customer at once to buy a new part, the greedy one who wants the few dollars in sight will probably attempt the weld and may succeed in making the fracture temporarily hold, but if there is only a thin portion of good metal left, the work will not hold for any

satisfactory length of time and the customer will do more harm than good to the welding trade.

There is another class of work not always refused, that is the cheap casting which perhaps can be obtained conveniently and at a cost lower than would be charged for welding, it is far better to advise the purchase of a new part.

If you will look over the photographs for a few minutes you will see what a variety of broken cast iron parts come in to the welder, nearly every one of them present new problems to solve this makes it very difficult indeed for the trade to give a price on the work when it comes in, and this is often demanded by the customer. Sometimes we lose money on a job.

I will furnish one instance. The large press shown in one of the photographs was shipped to us after we had seen a blueprint which did not accurately represent the extent of the fracture, we gave an estimate of $40.00 for the work, the casting arrived and when we looked it over we said it could not be done at the price, but we would take it at $60.00, the customer said he had shipped it on our estimate, but very liberally offered to split the difference and allow us $50.00 for the work. We used over $25.00 worth of oxygen alone on the job and our cost amounted to $53.65 without adding anything for overhead charges, the fracture was 3¼ inches deep and 16 inches across and when we were champering out the 45 degree angles necessary, we came upon a large cold-shut in the casting and the metal was spongy all around it, this had to be filled in with good metal and it took a lot of extra time and material, which we could not possibly forsee.

I could give you numerous instances similar to this case but this will suffice to show that the welding business is not all profit.

In contrast to this large casting we have welded successfully the smallest castings on an Underwood typewriter that had been dropped.

Cast-iron welds must be made with the fracture facing upward in a horizontal position whenever possible, in order to allow the filler-rod being fed into the molten metal flowing from the champfered walls of the section being welded.

If a broken part is properly welded by a skilful operator, with good material, it will be almost as strong as the original casting, and if extra metal can be built on it will be stronger, and can be machined. Much depends upon the intelligence and ability of the workman. The welding of cast-iron must be regarded as a trade which can only be mastered by degrees, working patiently from simple to difficult jobs gradually, and under the supervision of an experienced welder.

When we sell a welding plant we insist on the purchaser learning to weld at our works, or sending a man with good

mechanical ideas, preferably a man who has had some experience as a blacksmith or moulder, or a good iron worker or machinist. In two to three weeks such men are able to learn the use of the proper blowpipes for the work to be done, the proper mixtures and pressures of the gases, and care of the welding plant, and they can do simple welds, the rest must be learned by actual daily experience.

THE WELDING OF BOILER PLATE AND STEEL PIPE

It will not be very long before a school of welding such as the Northern Polytechnic Institute in London, England, will be necessary in Canada, where students may take a complete course in practical welding and cutting, pass an examination and receive a certificate. There should be a standard of efficiency fixed by law. This is particularly necessary in boiler welding, as a novice should never be allowed inside of a boiler, or combustion chamber, the risk is too great, the work should only be undertaken by skilled welders, who understand boiler plate work, and they should be under the supervision of a competent authorized inspector.

All boilers should be hydraulically tested after welding and water should not be run into the boiler until the welded part has entirely cooled down.

If you will again refer to the photographs, you will see one of our welders working at the foot of the stack in the combustion chamber of a large boiler, the torch is turned upward and new metal is being fed into scarred and cracked spots. The repair work took some three weeks, there being four boilers in the boat, a large saving in time and money over the older method of patching and caulking was effected and the work was tested for over three months before being passed as the chief engineer was not at all convinced that the oxyweld process was a success.

The oxyweld system is coming into use in all up-to-date shipyards and railroad shops where extensive repairs are required quickly, on flues, fireboxes, and worn down parts of shafts, copper and brass pipe repairs, also for cutting boiler plate, girders, and steel shafts.

The welding of cast steel while not so difficult as cast iron must be done by an experienced welder to insure successful results.

I could give you a number of examples of work on large cast steel parts of machinery, but time will not permit me to go into details, in each class of metal, so I will pass on to the welding of steel pipe, by giving you one instance of work now being carried on in this line at San Francisco, where some 50,000 feet of steel pipe was recently laid, every joint being

welded including all drips, fittings, valves, services and seals, making the entire system absolutely free of leaks, the gas will be supplied at high pressure (some 40 pounds per square inch), the mains run in size from 16 inches down to 8 inch, 4 inch, and 2 inch. The welding is done at the side of the trench or supported on timbers over the trench, and when a number of lengths are welded together the pipe is lowered by chains or rolled into the trenches.

If any of the members here are interested in this line of work, I shall be most happy to give further details. I might mention here that in England gas and water mains are being laid by the same process, particulars of which I shall also be pleased to furnish.

The welding of sheet steel doors, tanks, hot water boilers, vats, sinks, cylinders, barrels, and smoke stacks, is another very interesting branch of the oxyweld process which is progressing rapidly in Europe and the United States, and to some extent in Canada, this class of work is very simple, no flux being required, simply feed the soft Swedish steel wire to the edges which are butted together, and are not champfered, on thin sheet metal work.

Aluminum is a difficult metal for the beginner to weld as it must be handled quickly when the metal reaches a molten state, as it oxidizes rapidly, the oxide film which rises must be scraped away quickly and the metal puddled with a steel spatula, the use of a proper flux and filling rod are also of the utmost importance in order to ensure a strong weld.

In gear-cases and castings the edges of the fracture must be champfered, and the parts preheated carefully and after welding should be covered quickly and allowed to cool slowly.

The welding of brass and bronze is an art which not only requires a skilled welder, but the best of filling rods containing the proper alloys and carefully prepared fluxes, in order to obtain strong welds free from blow-holes. The metal should be preheated before applying the welding torch, and should be carefully annealed after the welding is finished.

We have welded copper tubes and made a success of it, but it is difficult and requires an experienced welder with the best of flux and copper filler, the cost of welding is higher than for other metals, owing to the refractory nature of copper, much larger torches are required as the metal is a great conductor, and notwithstanding the fact that we have 6,300 degrees Fahr. at the tip of our welding flame, the heat spreads so rapidly that it is difficult to keep the metal in a molten state within the fracture until the side walls flow in with the filler-rod.

THE CUTTING OF IRON, STEEL, AND CAST STEEL

This branch of the oxyweld process is entirely different from the welding proposition, a separate blowpipe being necessary in which there is an additional jet of pure oxygen which issues from the centre of the tip of the blowpipe or cutter, this jet is surrounded by openings which contain the mixture of acetylene and oxygen necessary to produce the preheating flame, the metal is first preheated to a red heat, and the cutting jet of oxygen is turned on, and this immediately produces combustion of the metal with the resulting formation of iron oxide, this is blown away by the high pressure of the oxygen and a clean narrow cut is accomplished, and the metal on each side of the cut is not injured in any way as the action proceeds rapidly, thus confining the heat to the edges of the cut.

In cutting up old boilers and scrap it is not necessary to use mechanical guides, but in the cutting of new work where a thin straight line is necessary or an exact circle, the guides should be used. I submit for your examination a few photographs, illustrations, and samples of the work we do. The cutting torch is especially valuable for cutting structural steel and for cutting boiler plate in connection with the manufacture of marine and other boilers, etc. For cutting away the wreckage of bridges or buildings where steel is used it effects an immense saving in time and labour. The cutting torch is also used extensively for cutting up steel shafts and cutting the risers off large steel castings.

Not long ago we were asked to cut up a large boiler so that it could be removed through the doors of an engine room which had been built after the boiler was put in, we did the work in half a day, cutting the boiler into four or five sections at a cost of about $30.00. It would have been necessary to have torn down the brick wall at one end of the engine room in order to get the boiler out, this would have cost five or ten times as much as our simple method of using the cutting torch.

I could give you a number of other examples of the value of the oxyweld process if time would permit.

In conclusion, I wish to say a few words regarding the most important part of my subject from the customer's standpoint. The cost. When the first welding plants were established in this country, oxygen was scarce, welders were scarcer and the apparatus was crude, prices were based upon how much money the article to be welded would cost new, and the welder tried to get as near that figure as he thought the customer would pay, this short-sighted policy did not pay after the industry had become established, to-day prices are quoted after estimating the number of cubic feet of oxygen and gas required, the material used, and the labour of champfering, welding,

and finishing, a fair advance is made on these costs, the same as in other departments of a well regulated shop. The result is that general satisfaction is given, but in the case of a large casting, where the customer is not a mechanic, or lacks some practical knowledge of machinery, a price may be quoted which is perfectly fair for the work, but seems utterly ridiculous to the customer.

If any of the members present would like to ask any questions relating to the different classes of welding and cutting I shall do my best to answer them, and I extend to all of you who are interested, a hearty invitation to visit our welding room at 10 Lombard Street any time between eight a.m. and five p.m., except Saturday, when we close at twelve o'clock, in the oxyweld department.

Thanking you for the honour of inviting me to address you, and apologizing for my shortcomings as I am not a public speaker, and not an engineer, I shall be most happy at any time to contribute anything new of interest in our line of work.

If I might be allowed just a moment or two, I see some friends of mine in the audience who are interested in this line of business and no doubt the members present would like to hear from them, and I would like to hear from them myself.

There is Mr. Chas. Royer who has come all the way from Montreal to be here to-night and Mr. J. Macmillan of the West Toronto branch of the L'Air Liquide Society.

Chairman,—

Your friends will be given an opportunity to speak in a few moments, Mr. Arnett.

I might say, gentlemen, that some two years ago Mr. Arnett invited me down to see his plant, but I am sorry to say that I did not avail myself of his invitation at the time, but a few months ago I happened to be going along Lombard Street, and I noticed their sign, so I went in.

Gentlemen, I was never more surprised in my life. I have been in boiler shops, railway shops and shops of all description but this was an eye-opener to me. The thought came to me that this would be an interesting subject for a paper for this club. I called up Mr. Worth, and asked him if he had any vacant dates for papers, and he said that he had, so I spoke to Mr Arnett and induced him to agree to give a paper here to-night

You would be surprised to see the number of different kinds of castings, etc., they handle. While I was there I saw a large number of prison doors made of sheet steel and angle iron. I asked the welder what they were going to do with these, and was told that they would be welded at each corner.

The thought occurred to me that not long since, an angle iron smith would have been called in for a job like this.

The welder informed me that they were going to weld these doors in a few minutes, and if I would wait, I could see the process, so I waited and it took them about thirty minutes in all to weld up the four corners. What took my eye particularly was, boys would come in with bits of broken castings, that you or I would never think of getting repaired There were several small jobs done while I was there I felt sure that a paper from Mr Arnett would be very interesting to you and I am satisfied that it has been

Mr. A. M. Wickens,—

In welding a fracture in a cast iron wheel, say three or four feet in diameter, and one of the arms is cracked. When you get that casting in to weld, I understand the crack will be open a little. What I want to find out is, do you have to build metal in that, in order to fill up that crack, or else would you not have the same strain on it as you had before it was welded, and consequently would still be just as it was, that is, with the same strain on it.

Mr. Arnett,—

We received a very large gear from the Don Valley Brick Works a few months ago to be welded. One of the arms were broken close to the rim and three of the teeth were broken out. The job was very successful.

I might tell you that cast iron gears and wheels are one of the most difficult things that we have to contend with.

Mr. Chas. Royer,—

As you say the casting was certainly under stress, because the crack had a certain opening. By proper preheating the gap should be made to slightly increase, and will be filled with molten metal. The extra metal used will make up for the shrinkage of the molten metal and also will make the strain disappear.

I would like to say a few words about the welding of cast iron. Many people think that because they had some pieces of cast iron welded which could not be machined afterwards, that the process is to be blamed, while this is actually due to improper use of the blowpipe. As most of you know, there are two kinds of cast iron, grey and white. The difference between the two is mostly due to the form in which the carbon is existing in the metal. In white cast iron, the carbon is combined or dissolved and makes the metal very hard and

difficult to work. In grey cast iron, the carbon is in the free state, forming little particles of graphite.

In welding, it is necessary to obtain grey cast iron, and so the requisite conditions to do so should be taken in consideration.

The rapid cooling of cast iron in fusion tends to bring the combination of carbon and iron to form white iron. In welding, special attention should then be taken to get very slow cooling so as to obtain grey cast iron.

Also the use of a filling rod containing a higher percentage of silicon helps the carbon to separate in a free state, and to make consequently grey cast iron.

Manganese should be avoided, as it has the contrary effect. Burning the carbon by the blowpipe will tend to produce white iron.

To resumate, I will say that it is easy to produce perfect welds in cast iron, easily to be machined by sticking to the following conditions.

Slow cooling: silicon in the welding rod—absence of manganese; avoiding to burn the carbon by keeping the welding flame at quarter inch to half inch from the molten metal; by using a proper flux which destroys the oxide formed.

I thought I would like to explain these little points which explain why the cast iron sometimes cannot be machined due to improper treatment.

Mr. J. Macmillan,—

I have very much enjoyed Mr. Arnett's paper. No doubt, you are all more or less interested in this oxy-acetylene welding process. Probably some of you possess welding outfits, and there may be others who are considering the purchase of one. I would like to give a word of advice to prospective buyers of welding plants: be sure that you get a plant which is large enough to handle the work which you intend to undertake. Be sure it is one that is built of the best materials and see that the people from whom you buy give you full instruction on its operation and maintenance.

This system has had somewhat of a set back in consequence of the number of irresponsible people who are getting up cheap "outfits" and placing them on the market—merely get-rich-quick schemes, and resultantly there are people who are prejudiced against oxy-acetylene welding, although it will do all we claim and more.

Mr. L. R. Arnett,—

These remarks are very true. I know of a case where an outfit was sold for $75.00 and the man did not seem to be able

to get any redress. He tried to weld, but couldn't do anything with it. He is naturally one of those who condemn oxy-acetylene welding.

Mr. Macmillan,—

With regard to oxygen; I suppose you all know that there are two gases used in oxy-acetylene welding, namely, oxygen and acetylene. Some people from the United States and other countries have been trying to sell different apparatus to make oxygen. I happened to see a set of blue prints that had been tendered to a man, and the people he got them from claimed that all he had to do was buy the blue prints, which were quite expensive, get an old kitchen boiler, some piping and a handful of chemicals and there you had oxygen!

Mr. Chas. Royer,—

I might call your attention to what I saw in the West a year or two ago. I saw one of these fellows using what they call a home made apparatus. He had a range boiler with a valve on it, and was manufacturing acetylene under pressure of fifty pounds, and you know that acetylene at that pressure and not dissolved, is one of the most dangerous explosives known, so he was practically tempting death. Home made apparatus should not be used and are mostly dangerous.

Mr. A. R. Taylor,—

This may be a technical question. I understand that there is a new process where they can separate the two gases in water that is H_2O hydrogen and oxygen. You use the oxygen, I understand for acetylene welding. The temperature you get is something like 6,000 degrees. If you used hydrogen it would be possible to get a higher degree of heat. Would you want this?

Mr. L. R. Arnett,—

No, a higher temperature than this could not be desired in welding with acetylene, and you would not get it with oxygen and hydrogen.

Mr. C. Royer,—

Oxy-hydrogen flame is 1,000 degrees lower in temperature than oxy-acetylene. The reasons why acetylene is preferred, are because acetylene gives hotter flame and specially a neutral flame.

Acetylene contains by weight, twenty-eight parts of carbon

for two parts of hydrogen, consequently, in burning gives at the welding flame carbon monoxide, and only a small amount of free hydrogen because at that temperature, hydrogen cannot combine with oxygen to make water-vapor or steam. Consequently, oxy-acetylene flame is neutral.

In the case of hydrogen, the products of combustion are water-vapor or steam which passing over hot metal are broken up and the oxygen absorbed by the metal.

This property has been used for manufacturing hydrogen gas, steam is passed on hot iron, the oxygen is absorbed and only hydrogen is set free.

In blowpipe using gases containing hydrogen, the same action takes place and, consequently, the iron is oxidized, which destroys all the properties of iron which are valuable.

In oxy-hydrogen welding, to reduce this oxidization effect, it is absolutely necessary to increase the theoretical amount from two parts of hydrogen to four parts of hydrogen to one part of oxygen, so wasting two parts of hydrogen which reduces also the temperature.

This applies to all gases rich in hydrogen, like coal-gas, gasoline, blaugas, etc.

To summarize, oxy-acetylene flame is the only suitable for welding of iron and steel, on account of the higher temperature of the *neutral flame* and of the better efficiency of the gases used.

Mr. G. C. Mooring,—

May I ask what pressures do you use when welding and is there any advantage in using high pressure?

Mr. L. R. Arnett,—

There are two schools of welding, the high pressure and the low pressure. Some people believe that with acetylene you must always have high pressure. I do not believe in that myself. I am of the opinion that high pressure is only necessary when you are on a very heavy piece of work.

Mr. Macmillan,—

In the case of shop where you are using two or three benches, it is easier to pipe. This is one of the advantages of the high pressure system.

Mr. Arnett,—

My experience has been that if your generator is properly constructed and regulated it will automatically take up the

oad, but that does not apply to all low pressure generators that are on the market.

Mr. Chas. Royer,—

I would say that both systems are being used and I have seen good results obtained from each system, I think the choice is mostly a matter of personal opinion.

Mr. J. B. Robb,—

Would there be any advantage in using a high pressure torch for cutting purposes, due to the fact that it would tend to blow the metal away from the edge of the cup.

Mr. L. R. Arnett,—

Not if you had sufficient pressure on your acetylene and it was good metal.

Mr. J. B. Robb,—

Why is it that the oxy-acetylene system will cut more quickly than the electrical.

Mr. J. Macmillan,—

I might just say that the electric welder does not cut, although it melts the metal.

Mr. A. M. Wickens,—

I feel that we have all been very highly pleased with Mr. Arnett's paper, and it will undoubtedly be useful to us. I take much pleasure in moving that a hearty vote of thanks be extended to Mr. Arnett for the very nice way in which he has treated the subject of oxy-acetylene welding and cutting in his paper to-night.

Mr. G. C. Mooring,—

I have much pleasure in seconding that. I have had some severe bumps in acetylene welding; in one case I had a casting that was welded three times, and then not rightly. Therefore, I am one of the kickers. The paper has nevertheless been very interesting to me.

Chairman,—

Gentlemen, you have heard the motion. All in favour please signify in the usual manner. Carried.

Chairman,—

Mr. Arnett, this is not the first time that I have had the pleasure of extending to you the hearty vote of thanks of a meeting, and I trust that it will not be the last.

I am sure that every member present this evening has enjoyed your paper, and it just goes to show what those who are members, yet do not attend the meetings, miss.

We trust that at some future date you will be able to come and read another paper before us along these lines.

Mr. Arnett,—

Mr. Chairman and Members,—I thank you very heartily for your kind vote of thanks. I am afraid my effort has been a very lame one. I think that it would be worth the time of anyone present to call at our plant, and I think that we could tell you numerous things, so call in some day when you are passing. I convinced Mr. Baldwin, and I am satisfied that I could convince any of you present. We have got to work against the same odds as they did at the time lighting with acetylene first came out, but acetylene welding has come to stay.

Moved by Mr. A. M. Wickens, seconded by Mr. Jas. Wright, that the meeting adjourn.

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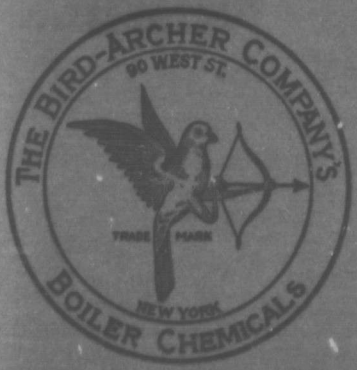

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