apprentice education

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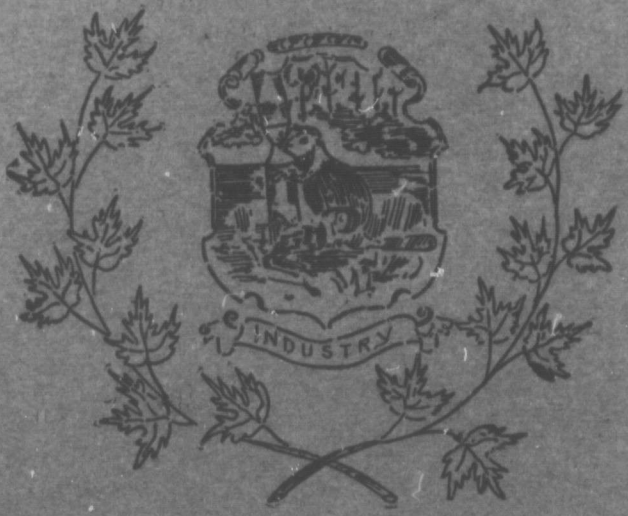
THE CENTRAL RAILWAY AND ENGINEERING CLUB



OF CANADA

OFFICIAL PROCEEDINGS FOR MARCH, 1907

W. KENNEDY, *President.*

C. L. WORTH, *Sec-Treas.*

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

OFFICIAL PROCEEDINGS

Vol. I. No. 3. TORONTO, CAN., March 19, 1907. $1.00 per year, 15c. per copy.

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PROCEEDINGS OF THE CENTRAL RAILWAY AND ENGINEERING CLUB OF CANADA MEETING.

ROSSIN HOUSE, TORONTO, March 19th, 1907.

The President, Mr. Kennedy, occupied the chair.

Chairman,—

As time is passing and we have a very interesting paper before us to-night, I think it would be best for us to proceed to business. Mr. Brown of the Westinghouse Air Brake Co.,

I understand, is not present this evening, so, if agreeable, I think it would be well to leave the discussion on previous paper until some future date when Mr. Brown may be able to be with us.

I understand the Minutes of the previous meeting have been distributed among the members..

Moved by Mr. Burrows, seconded by Mr. Jefferis, that the Minutes of previous meeting be adopted.

Chairman,—

I have nothing at the present time to bring forward for the welfare of the Club. As I have said before we have a very interesting paper before us, and in order to save time we will proceed with the next order of business, which is:

"New members," which have been approved by the Executive.

NEW MEMBERS.

W. H. Ginder, President Ontario Lantern & Lamp Co., Hamilton. Ont.

E. F. Dartnell, Merchant, Montreal.

D. A. Cole, Manager the Philip Carey Mfg. Co., Toronto.

W. Carter, Representative Engineer Canadian Rand Drill Co., Toronto.

Thos. Miller, Representative Engineer Canadian Rand Drill Co., Toronto.

A. A. Bowman, Manager Canadian Rand Drill Co., Toronto.

W. H. Jackson, Representative McColl Bros. & Co., Toronto.

J. G. Abraham, Representative Mildram Forced Draught Furnace, Toronto.

J. E. Lenehan, Representative Galena Signal Oil Co., Toronto.

W. Chambers, Superintendent Fairbanks Morse Canadian Mfg. Co., Toronto.

Thos. J. Ward, Steam Fitter G.T.R., Toronto.

D. A. Nixon, Chief Engineer, Temple Building, Toronto.

Thos. Wiles, Machinist G.T.R., Toronto.

J. Duguid, Foreman, Machine Shop G.T.R., Stratford.

D. C. Hollowell, Air Brake Inspector G.T.R., Toronto.

W. Ives, Machinist G.T.R., Toronto.

Jas. Powell, Chief Draughtsman G.T.R., Montreal.

W. D. Robb, Superintendent of Motive Power, G.T.R., Montreal.

Fred. Wickson, Draughtsman, Toronto.

J. C. Brady, Machinist G.T.R., Stratford.

J. E. Stephenson, Mill & Factory Supplies, Toronto.

J. J. Birchard, Salesman Cluff Bros., Toronto.

M. Wright, Engineer G.T.R., Sarnia Tunnel.

MEMBERS PRESENT.

R. Preston.
Thos. C. Miller.
W. H. Randall.
I. Jeffries.
Acton Burrows.
Geo. Baldwin.
G. W. Williams.
T. McHattie.
E. Logan.
H. Foster.
C. W. Carey.
H. G. Fletcher.
A. Shand.
J. Mooney.
J. McWater.
J. R. Armer.
F. A. Purdy.
J. W. Perry.
R. Perrin.
E. D. Jamieson.
W. R. McRae.
A. R. Thompson.
J. G. Abraham.
E. L. Piper.
Jas. Powell.
H. H. Brewer.
A. A. Bowman.
F. W. Brent.
C. A. Jeffries.
A. Wiles.
R. Pearson.
J. T. McGrath.
Geo. Cooper.
G. S. Thompson.
J. Hay.
G. D. Bly.
J. V. Jackson.
R. G. Gilbride.
W. J. McIntyre.
G. A. Wilkie.
F. W. Burrows.
A. Maynes.
R. Ivers.
J. F. Campbell.
O. A. Cole.
W. D. Robb.
W. Kennedy.
N. MacNicol.
A. G. McLellan.
R. N. Card.
J. C. Garden.
Jno. A. Carey.
I. O. Frost.
H. Ellis.
R. L. Frost.
W. Gell.
M. W. Barker.
R. McMillan.
J. H. Stortz.
D. A. Dixon.
A. Logan.
F. R. Wickson.
J. M. Clements.
C. L. Worth.

Chairman,—

As stated before Mr. Brown, representative of the Westinghouse Co., not being present with us this evening, it is considered well to waive this discussion until some future date.

We have with us to-night Mr. R. Patterson, Master Mechanic of Grand Trunk Railway, Stratford, who has kindly consented to give us a paper on the "Apprenticeship question," and I have no doubt it will be of great interest to all present. Mr. Patterson has had a long and varied experience with apprentices, and I am sure the paper read by him will be of interest to all. I have much pleasure in introducing Mr. Patterson.

THE NECESSITY OF TECHNICAL EDUCATION FOR THE MECHANIC OF THE PRESENT DAY.

BY MR. ROBT. PATTERSON, MASTER MECHANIC STRATFORD SHOPS, GRAND TRUNK RAILWAY.

Being much interested in the training of apprentices for the mechanical trade, also in the education of the younger mechanics, any papers read or discussion on the subject, have always been of great interest to me, and when asked to read a paper on some subject before the members of this club, I selected this one, not perhaps so much with the idea of imparting much new information, as with a view of bringing before you a subject that is of great importance, requiring careful study and attention of the industrial community of Canada, and those responsible for the proper education of Canadians to-day.

A glance at the title of this paper might give the impression that I favored the university educated mechanic or mechanical engineer. No doubt those who have read the advanced copies will realize that I only partially approve of same, and that a system of combined practical and technical education should precede any such course.

Papers without number and discussions without end have been dealt with to try and settle the question as to whether the university educated man or the practically educated man has been the most successful in giving the best results to their employers and the mechanical world at large. Although there have been numerous university graduates who have shown great brilliancy and accomplished *much*, yet the practical man has not by any means been outclassed, and is probably holding more positions of high responsibility and trust to-day, than his university graduate competitor.

However, it is not this phase of the subject I wish to deal with, but the technical education of the average mechanic, and the system of education by which it can be most successfully accomplished as to thoroughness and economy of time.

In this young and growing country of ours, the rapid development of steam and electric railroads and the vast increase in manufacturing industries have created a demand for increased and rapid facilities for doing work, and for producing mechanics able to keep pace with the development. From all appearances the future will create a still more urgent demand. To meet present and future requirements, a quick and thorough system of education will be necessary to provide adequately trained men to meet these requirements.

The men at the head of our public educational system to-day have already realized this, and as a result the boys in our public schools are taught manual training. The system should be in force in every centre in the country. It would help parents

and guardians by enabling them to judge of the fitness of the boy for his future profession, mechanical or otherwise. It is a great assistance to the boys who intend to enter the mechanical profession, and best of all it is teaching him to appreciate, respect, honor and have a desire for honest manual labor, an attitude of mind which will be of incalculable benefit to the individual and will produce a beneficial effect on the country at large.

To begin with, the boy or young man who intends becoming a mechanic, or mechanical engineer, should have a partial high school education. This would ensure good ground work for his further development during his progress through the shop, and while learning his trade, in addition to his practical every day instruction which ought to be under the supervision of a thoroughly trained and competent instructor, his technical training should go on at the same time, and it should be just as much a part of his duties as to turn bolts, fit up a motion, etc.; in other words the boy or young man's practical and technical training should be combined and go hand in hand until he develops into a full fledged mechanic or mechanical engineer.

To accomplish this it will be necessary that employers establish a system of technical education in connection with their works. I would urge the wisdom of our government making liberal grants for technical education and the necessity of making our technical schools really technical, and not so in name only. Boards of Trade, etc., might interest themselves in this matter with good effect, and we might have a splendid system of technical education which would at least approach that of the United States and Germany.

A number of corporations in the United States have schools in connection with their shops, and on the Grand Trunk Railway system we also have a system of technical training for our apprentices, which takes them through a five years course in mathematics, applied mechanics, mechanical drawing, and machine design, but I would add to this (what I think would make the system complete) a one year's course at the university. That is the university should have a special one year's course for young men who are capable after learning their trade of passing an entrance examination, and on payment of a small fee, be able to take this course. In this course he would have the privilege of making experiments, tests, etc. A young man who wished to succeed and obtain a more advanced education could do so and could pay his way which would be preferable. A young man who could see this opportunity before him would thus be stimulated throughout his apprenticeship and would be more diligent, attentive and ambitious.

In addition to the actual information in connection with his work which he would get at the university, and which he

would be able to take in more readily on account of his five years' practical and technical training, he would receive general improvement by coming in contact with men of learning and culture for a year. This would not take him so long from the practical work as would a four years' course for, after a four years' course he would find so many changes that he would require to go over a great deal of ground again.

This system should also extend to the younger journeymen mechanics, and where technical schools are not provided in the locality, or even if they are, corporations and manufacturers should provide tuition for these employees, who if capable of passing necessary entrance university examinations, could avail themselves of the one year's special course. This would be of great benefit to employer and employee as well. There would always be a number of well educated practical men available for responsible positions, and with this course we would have our mechanic well educated, but contented with his position and work, and not feel disappointed because he had the education, and not always the position, but would be satisfied to get what was coming to him on his merits.

In conclusion I would say if we combine the practical and technical training of our boys and young men we would have the best average mechanic who will meet all requirements of these times of rapid progress and development and we will, I believe, solve labor problems to a great extent.

Chairman,—

I am sure we are all very much indebted to Mr. Patterson for the time he has taken to prepare this paper, which will no doubt bring forth discussions, but before leaving the paper open for discussion, I might here say, for the benefit of all present, that we have with us to-night Mr. McHattie, past President of the Canadian Railway Club at Montreal, Mr. W. D. Robb, Vice-President and Mr. Powell, Secretary of the same club. I am sure we all shall be pleased to hear from Mr. McHattie.

Mr. T. McHattie,—

Mr. Chairman and gentlemen:—Am very much pleased to have had the opportunity to be present at your Club meeting to-night and wish to congratulate the Club on the large attendance at this meeting.

I did not come here fully prepared to discuss the matter of technical education, but may say that the general education of the youth of our land is always a very important subject, and many of our great men are devoting much thought on the matter. Governments are also dealing liberally with this question, and no doubt improved systems and practices will be the result.

With regard to the technical education of the apprentices passing through our shops, this is necessary to produce good all round men. The Grand Trunk Railway Company and its officers have done and are endeavoring to do much to improve the education of all these boys who have entered the service for a practical education, and young lads with determination and application have a splendid opportunity to improve their knowledge of the work.

The idea proposed by Mr. Patterson, whose long experience in this direction qualifies him to speak with authority on the question, has considerable merit, as in our experience we have found cases where young men first took up the university course and after graduating were very much disappointed that they could not obtain good positions without first taking up some years of practical work in the shops.

As I understand, Mr. Patterson had in mind that a very large percentage of our young mechanics do not have the opportunity to take up a university course, as circumstances force them to take up work soon after leaving the high schools, and it is this class he wishes to finish up with a short term at the university to perfect themselves on certain subjects to the study of which they have been devoting their spare time while following up their work in the shops.

This whole question is undoubtedly surrounded with difficulties and in the end much depends upon the boys themselves; systems, rules, practices will not effect all the results desired, unless we have the earnest co-operation of the student. All our young men should devote as much time as possible to self-improvement by reading good literature on the recorded experiences of others, attending lectures on technical subjects, and grasping with avidity every opportunity to increase their general knowledge. If this is done, success in no small measure is assured.

Chairman,—

As I said before, we have with us to-night Mr. W. D. Robb, who has taken a life-long interest in this apprenticeship question, and I think it may be safely said, that he was the first one in Canada at least, to inaugurate a proper system of educating apprentices in railroad shops. I am sure we shall be pleased to hear from Mr. Robb.

Mr. President and gentlemen,—

Permit me to express the pleasure it affords me to be here this evening. I did not think, when I came to Toronto that I would be present, or at least, I did not think I would be called upon to say anything. I must say, however, that I

am agreeably surprised to see such a representative gathering of gentlemen here to-night, and such a large number, considering that the club has been so recently organized. I understand you now having a very large membership, not counting the sixteen which have been initiated to-night, and after being with you I feel that I must be the seventeenth. This rapid development speaks well for the future of this organization, and in view of the extraordinary advancement that is being made by railroads, and new industries springing up, this development is certain to go on.

I do not think, Mr. President, that anyone in Canada, or in fact in the railroad world is better fitted to speak on the apprenticeship question than Mr. Patterson. He served his time as an apprentice, became a journeyman, and worked up to the present position which he holds. His efforts, to a large extent, have been responsible for the apprenticeship system on the Grand Trunk to-day.

If you will permit me to disgress a little,—The Railway Club meetings in Montreal are usually held on a Monday, but while considering bringing the Grand Trunk Master Mechanics together in Toronto for a meeting to consider Company's affairs, it was requested that the meeting be held on Tuesday to give the gentlemen an opportunity to attend this function to-night. I was very glad to arrange this, and I do not see why we should not be able to arrange our Master Mechanics' meetings in future, to permit, at times, of their attendance at the meetings of this club as well.

As stated before, I do not feel anyone is better fitted to speak on this apprenticeship subject than Mr. Patterson. He has touched on a question that is of vital interest to all railroads throughout the country, and it was a very lively topic at the Master Mechanics' Convention held last summer. Mr. Bosford, representative of the Engineering Journal, stated at that meeting, that he had practically canvassed the United States, communicated with superintendents and managers and the majority realized it was a mistake to fill positions of responsibility with men direct from schools or colleges, who had no practical training. Mr. Bosford cited a case where a technically educated man was found sitting beside a boiler making a test while the rest of the establishment was without proper supervision. I feel that with the present development and advancement some system, such as Mr. Patterson has outlined, is an absolute necessity. As outlined by Mr. Bosford at the Convention, we have a fairly good apprenticeship system on the Grand Trunk. I have numerous enquiries from superintendents and other railroad officers throughout the country for information respecting our system, and in conversation with these men they agree that their great trouble is not so much

to get mechanics, but leaders who in addition to mechanical knowledge, have the faculty of handling men.

What Mr. McHattie stated a while ago is very true. We have men come from England, Scotland, etc., with certificates and letters of recommendation of every kind imaginable, but when I say to them, "What can you do? Can you go into the shop and handle men?" they say "No." They have taken a technical course, but cannot be called executive. They are sometimes good men to work in the ranks, but not qualified for positions of responsibility and authority.

It is therefore far better for the employer to educate his own men and give them a technical training along with their practical work.

Under the apprenticeship system on the Grand Trunk we start the boy at fifteen or sixteen years of age and compel his attendance at the classes. At first the attendance was voluntarily, but this was not successful, as the majority lost interest and the attendance would drop lower each week, but now that it is compulsory we are making some excellent mechanics, and I believe some of the drawings shown at our competitive examinations are as good as could be produced on the continent by boys of the same age and experience no matter what their calling may be.

Manufacturing concerns as well should have an interest in this question. One and all should adopt means to educate their young men who are to handle their business in the future.

I am not prepared to speak to-night on the effect of government control of this important question, but I do say that a technical education associated with the practical work is bound to turn out the very best mechanic I care not what line of mechanical work he may follow, and such a system as a whole is certain to be a source of national benefit.

Chairman,—

We shall now be very pleased to hear from Mr. Jas. Powell, Secretary of the Canadian Railway Club, Montreal.

Mr. Jas. Powell,—

Mr. President and members of the Central Railway Club, it is a pleasure for me to be present with you to-night, and as Mr. Robb has said, to see such a large gathering. I was sorry that I was unable to attend the first meeting of the Club, although it was my intention to do so, however, I gave what assistance I could to Mr. Worth, and to-night I have enrolled myself as a member and trust I shall have the pleasure of being present at some of your future meetings. In connec-

tion with your Club, I will state that you are travelling much faster than we did at the commencement.

You have had a much larger growth in the three meetings than we had, which speaks well for the future prosperity of the Club.

I should like to say that at our last meeting we inaugurated a scholarship at the McGill University for sons of members, appropriating $200.00 a year for four years for the son of a member getting the highest percentage in a matriculation examination for entrance to the university. There was sufficient funds in the Club and it was thought we could not devote it to a better object.

The paper this evening, which Mr. Patterson has taken for his subject, is a vital one and one in which I have been particularly interested for some years, and one that I know there is a growing need for. I have had young men, and older men, after they have been in the shops for some time, when they found out that there was something better to be gained, come to me and asked me if I would take them in hand individually and collectively and teach them how to make and read drawings and also instruct them in practical mechanics.

I have watched with pleasure and pride these young men go out into the world and rise to positions of responsibility and have had numerous cases where some of these have written thanking me for the start they got through the instruction they received.

This question of technical education should not be an apathetic one. Canada is just rubbing her eyes and yawning, England has wakened up to the necessity, whilst Germany and the United States are reaping the reward of their far seeing policy in this respect.

There are very few technical schools in this country and very few opportunities of acquiring any higher education in the industrial line. While we have a few universities, these in a measure do not reach the masses. There should be opportunities for students to attend classes in the evening and where possible for employers to permit apprentices to attend during a portion of the day.

The Montreal Board of Trade and also the Chamber of Commerce have taken this matter up, as well as the Provincial Government, but the question is of such importance that it should be made a national one. I would, therefore, urge all present to do their utmost to impress on the Boards of Trade, Chambers of Commerce and members of parliament, the absolute necessity of providing means for the young men of this country to obtain a technical education.

Chairman,—

I shall be pleased to hear from anyone who wishes to make any remarks on the paper before us this evening.

Mr. C. A. Jefferis,—

President and gentlemen:—I did not know you were going to bring Messrs. Robb and McHattie down here, and they have said all I wish to say; however, I would like to say it again.

I have listened with a very great deal of interest and pleasure to the very excellent paper Mr. Patterson has given us tonight. He has indeed covered the ground so well, and so ably that there is not much left to be said.

I will, however, say a word or two about that phase of the subject which Mr. Patterson did not deal with, but referred to, namely, "The placing of technical and university men in positions of responsibility, where years of practical experience is absolutely necessary."

About fifteen years ago, on some of the larger railways in the United States there sprang up the tendency to place men from technical universities, in positions of great responsibility in the motive power departments of railways without their having had much else than a little office experience, and a few trips over the roads. Great things were looked for and expected of them but the desired results did not materialize, and in a couple of years other positions were being found for a great many of them. The practical men were again being placed in the various positions of responsibility, that was when it became necessary to do things and do it now, because we need it. We will experiment afterwards if we have time. Now, what was the trouble? Surely their education was not a detriment. I wish to say with all emphasis, *certainly not*, but some practical experience was very necessary just in those positions in which they were placed, and unfortunately for the railroad companies they did not have enough practical knowledge. Nearly all these fellows were splendid men and clever. Now, where was the mistake? The trouble was simply this, that the boy was sent to the wrong place first. Another remedy is, and always will be, send the boy to the shop before he goes to the university. If you do not you will make a mistake and spoil your boy. After a young man has been through the university, he feels that the drudgery of shop life is beneath him, and should he have to start at the bottom, why the idea of expecting him to drill holes, fit bolts, bore rod brass or grind steam pipes, and be contented, is simply absurd. He does not like the idea and he never will. You sent him to the wrong place first.

But, Mr. Patterson has so ably struck the keynote to the situation, when he says, let him carry both along together,

and then the special course at the university, that is truly the ideal.

Now, just a word of the practical man, who yearns all his life for something he has not got. He can do the work all right and if he could only lay it out theoretically and express himself technically, he would be perfection. However, as the years go by we can only benefit by experience, and try to improve the training of those who are to follow.

In closing I want to personally thank Mr. Patterson and say to him that I have been reading mechanical papers for over twenty years, but this is the best paper on the subject I have ever read. I am sure that the Grand Trunk Railway is fortunate in having such a man in their service and the Central Railway and Engineering Club, in having him for a member.

Chairman,—

Up to the present time I think the question under discussion this evening has been somewhat one sided. There are some here who have received a technical education, and I think it would be well to hear from them. We have with us to-night Dr. Galbraith, who gave us a paper three months ago, and I am sure we shall be pleased to hear from that gentleman.

Dr. J. Galbraith, Principal School of Science,—

Mr. President and gentlemen: The question of technical education is a very broad one and its field has become much diversified in late years—it now seems to cover the education of the civil, mining, mechanical and electrical engineer, of the stationary, locomotive and marine engineer, of the machinist, moulder, blacksmith, carpenter, plumber, mason, etc. Of the textile worker, tanner, glass maker, brick maker, etc., etc. It extends in fact into all industries. It is evident that the education that will fit one of these cases may be entirely unsuitable for another.

Instead of one technical education there are many technical educations. It thus becomes a difficult matter for a municipality like Toronto containing many widely different industries to devise a satisfactory and economical system of technical training. A town largely devoted to one industry would on the other hand find the problem comparatively simple.

If a sufficient number of students can be gathered together who are striving towards the same end it is not a difficult matter to devise a suitable system of training.

The apprentice schools established by the Grand Trunk Railway are examples of the correctness of this statement.

So also are our engineering schools at Toronto, Kingston and Montreal, although designed for a different purpose.

The public and even the professions and trades as a rule expect too much from the graduate fresh from his technical training school. They forget that his training is not intended to enable him to do the work of an experienced man but rather to make better use of his future opportunities than would otherwise be possible.

It is a question often asked whether it is better for a lad to take his practical training first and his scientific training afterwards or in the reverse order. As far as engineering students are concerned, those we are dealing with in the schools of practical science for instance, my answer is that it depends upon the special case. A lad of a studious disposition will benefit on the whole by being broken in to practical work before entering the engineering school, on the other hand, one whose tastes are not scientific and studious will probably be benefitted by taking his technical training first. As a rule there is not much room for choice; external circumstances settle the matter.

I have listened to Mr. Patterson's excellent paper with great pleasure and would suggest that an interesting and useful paper might be prepared by him or some other member of the Club giving the details of the course of instruction established for apprentices by the Grand Trunk—together with the numbers in attendance at the various classes and the general apparent results of the work. The more information available with respect to special features of technical education the better.

Chairman,—

We have with us to-night Mr. R. Preston, our second vice-president. We shall be very pleased to hear from him.

Mr. Preston, Master Mechanic C.P.R.,—

I do not know that I can say a great deal on the subject. I was very much interested in the paper presented by Mr. Patterson, and I think the question is a very live one along the lines laid down by Mr. Patterson. The trouble we have on the C.P.R. is in getting apprentices, or young men who will take hold of the business. I do not know whether we treat them any worse than the Grand Trunk, but that is the situation around Toronto. I do not know that I can say any more on the matter.

Chairman,—

We have also with us Mr. McGrath, Master Mechanic of the Grand Trunk Railway at Fort Gratiot, and I am sure we shall all be pleased to hear from him.

Mr. J. T. McGrath,—

While I expected to be here at this meeting to-night, I did not figure that I would be called upon to say anything.

Referring to Mr. Patterson's paper, there is no question but what the education of our apprentices is one of the most live questions we have to-day before the motive power railway officers. We have many bright boys who come and start with us and who appear to be very studious, and as Prof. Galbraith says, wish to become proficient at their chosen line of business, intending perhaps later on to take up a college course, but after spending considerable time in shops they seem to drop their good intentions and in the majority of cases it ends there. I do not know whether it is best to send the boy to school first or take the shop experience first, but rather think it best for the boy who takes up a technical education to have the shop part of it first. I think he will get along much faster than the average boy who will start in at the college part of it first. The main feature is, after all has been done, if the graduate expects to succeed and take over a responsible position, he must not only have the technical and practical part, but must be able to handle men.

I do not think I can say any more from what has been said, and I thank you Mr. President for calling on me.

Chairman,—

There is one thing in connection with the paper read by Mr. Patterson, which has not been brought out by anyone who has spoken so far; that is, the apprentices who enter into our railroad work are mostly children of parents who possibly have not got the ways and means of giving their boys a technical or scientific training in these lines. These apprentices come to us early in life, and those at the head of the forces know what training the boy needs in order to fit him for his future career, but the boy very often, unfortunately, does not know what he wants until he has been at the business a number of years, but as he grows a little older he realizes that he has got to have something else besides the practical training. I must say in defence of what Dr. Galbraith has said a short while ago, I have had men come to me who have taken a technical education first, and turned out first class in every respect. Our apprentices in the shops have not always got the means of getting their training, and as Mr. Patterson has explained to us, I think our government should arrange to aid in educating our boys, who cannot always get their technical training at the end of the fifth year of their shop work, as by that time he has responsibilities in life which will not allow him to obtain this education desired. I think there should be schools opened at night, whereby our apprentices can be trained.

Mr. A. A. Bowman,—

Mr. President and gentlemen:—As one of the new members I wish to express my pleasure in listening to Mr Patterson's paper and to the discussion following. If I got his meaning correctly, Dr. Galbraith is inclined to think that it may be better in some cases to go to college first as a boy is apt to become interested in athletics while in the shop and neglect his studies. Personally, I am strongly inclined to favor sending a boy to the shop first. Not only can he get a more thorough technical grounding at an earlier age, but responsibility and working under actual business conditions make a man of him. It also gives a boy a better chance to find out whether he is fitted for engineering before spending money on a college course, which means more to him when he has worked to get it. A friend of mine served his apprenticeship and afterwards went into medicine. If he had taken his college course first it might have prevented his going into his chosen work. Perhaps I am looking at the question from a personal standpoint as I served four years apprenticeship in the machine shop, before taking up engineering at McGill. We are arranging to celebrate the eighth anniversary of our graduation, and in going over our class list, it is rather interesting to find, that, generally speaking, the men who had practical experience before going to college, occupy the best positions to-day. At all events, the longer I am out of college the more convinced I am that the man who takes his shop training first and his college training afterwards will, generally speaking, be the better man eventually.

Mr. J. C. Garden,—

Mr. President and gentlemen:—I do not feel that it is within my latitude to make any remarks at this late hour, after all that has been so ably said already. One of the questions which Mr. Patterson raised, which I beg to repeat is, the difficulty which we have in getting the right class of apprentices in a place like Toronto, where there are so many better inducements than a trade. In listening to Mr. Patterson's paper it struck me as most pathetic that a boy after serving five years apprenticeship must go to college to meet a man of culture. Why should machinists, master mechanics and foremen not be as cultured as our students and professors. About sixteen years ago I was a more of less prominent member of a labor organization and on one occasion was called upon to make a speech and said:—

"Gentlemen, what we want we can get only by education. Let us educate ourselves and our apprentices."

"To H—— with education, what we want is more money,"

they replied, and until we get culture among our men this, I think, is a condition which is going to prevail."

Chairman,—

I am sure there are many present who could say something more on this paper. Please do not be backward in coming to your feet and speaking your mind.

Mr. Albert Stanford,—

Mr. President and gentlemen:—As I was a little late in coming I did not hear Mr. Patterson's paper, but judging from the remarks made since I arrived, the paper must have been a good one.

I was not as fortunate as the brother who served his time in Nova Scotia and then went to college. I began when I was thirteen years old and served four and a half years in the Illinois Central Railway shops in North West Iowa. We had to work hard those days and as my folks were farmers and had to haul everything across the prairies a long distance. I decided to go on the railroad and learn a trade and learn all I could at the same time from books as well. I always carried with me a small text book and studied it at spare times always determined to better my conditions.

I quite agree with Dr. Galbraith about going to the shop first. If the boy of to-day begins and goes through what we did in those days perhaps working hard all day chipping large castings, and later on when he gets farther up and is working in the roundhouse under engines just in from a long run covered with ice he will forget all about football, and I think he will begin to think seriously of striving to make of himself a more competent man capable of a higher class of work—that is if he is of the right sort as this work would be only an incentive to something better. I have had over 22 years experience now and have found that the young man who starts out to serve his time, soon shows whether he is going to make a success or not. It all depends upon the manner in which he takes hold of the business. If he is not naturally interested he might as well not continue in it. I think if our foremen and men who have charge of the different shops treat the boys and men with courtesy and try to help them that they could gain culture and refinement by careful observation and travel, they can easily get in the business—without the college, that is for the boy who is not able to attend school as I could not. In the West those days there were no technical schools to attend.

There is no question in my mind that the boy spoken of by the professor as not being studious and desiring a game of

football, etc., to the shop work, if sent to school first will get so rapt up in his games and easy times that never in later years will he steady down to hard work and especially to four cents per hour which similarly must be done in learning any trade if he wishes to attain the highest success.

I do not think there is anything more I care to suggest or offer at present.

Mr. McIntyre,—

Mr. President and gentlemen:—There was one point which Mr. Patterson touched on which has changed my opinion. I was formerly opposed to manual training in the schools, but I am converted now. That is all I wish to say.

Mr. Robt. Patterson,—

Mr Chairman and gentlemen:—I am just going to make a little confession now. Before I decided on the subject of the paper for this evening, I thought I would give a paper on the subject of "The University Educated Man versus The Practically Educated Man in Mechanics," and then work my views in on the side, but after considering the matter more fully, I determined to read a paper along the lines that I conscientiously felt ought to be in force in our country for the education of our mechanics and mechanical engineers of to-day so as to meet our rapidly growing requirements and incidentally I believed the subject at first thought of would be worked in during the discussion which has been the case and such discussion has very much broadened the original paper.

There are just one or two criticisms which the President, and Mr. Garden made that I would like to explain. It was not my intention to have a young man go to the university during the last year of his apprenticeship but after he had served his full apprenticeship, if he desired to succeed and obtain a further education an opportunity should be given him to do so. It may be one year or two years after he has completed his time that he would desire to avail himself of this privilege, and I think the average young man would be in a better position to avail himself of this privilege when he would be receiving remuneration as a journeyman than before when he would be in receipt of small wages and had to depend on his parents for support.

If the government of our country would provide a proper university course as outlined, there is no doubt that innumerable young men would avail themselves of the opportunity of such a course, and be able to pay their own way if the course was only reasonably expensive.

I agree with Mr. Garden when he says every master me-

chanic and foreman should be a gentleman and while this is true, I think you will agree with me that the association with cultured men that will be found at a university will have a most beneficial effect on a young man after a five years' course in the ordinary shop.

Another point I want to emphasize is that in taking a short technical course in the university a young man could with the practical and combined technical knowledge he has obtained, crowd several years work into one year. He would be more receptive and better adapted for the knowledge he was to receive.

By a four years' course it would take him too long away from the practical work, and with our rapid development and competition of the present day, it would be injurious to the young man, but by taking a one year's course it would not take him away too long from the practical work, and would I think, just give him the training most desirable for his future success.

With regard to Dr. Galbraith's remarks in reference to the necessity of a young man knowing just what he is going to do or employment to follow, so that he could then be educated along those lines, the course outlined by me, would just fit, in as after he had been trained in his business practically and technically (combined), he would then be in a better position to accept a short course in technical training along the lines he most needed, even if it be paper hanging, or any other trade.

I am glad that we have with us to-night a number of prominent gentlemen, for one particular reason, that is, the superintendent of education in this particular province to-day is considering this matter very closely, and I am sure he will read with interest what has taken place to-night, and it will perhaps aid him and his colleagues in reaching a decision.

We have universities provided for the education of doctors, lawyers, and a college for the education of our farmers to make cheese, butter, etc., but think how much they spend in educating our mechanics. They are educating everyone else but the mechanic.

There is one thing I would like to see carried here to-night in particular; that is, a resolution to our government, bringing this question forth. I do not think it would be beyond the sphere of this club where there is such a large number of representative men, to pass a resolution asking them to consider the question of the education of the mechanics of our country and make necessary provision for their technical education as they do for other professions.

Chairman,—

I am sure, gentlemen, we all are very much indebted to Mr. Patterson for the trouble he has taken in presenting this paper, and the able way in which he replied to criticisms. He explained away that portion of the paper I criticized to my entire satisfaction, and I am glad he did. But as I said before, the principal thing is not to lose sight of the bright boy who wants to advance himself, but, through no fault of his own, cannot do so.

I think the resolution Mr. Patterson suggested is a good one and if agreeable to the members, I would suggest that someone put a motion to that effect.

I would move that the minutes of this meeting be forwarded to the government, and ask them to consider this question and make necessary appropriations for the proper education of mechanics in Canada; also that a manual training school be established in every centre where it is possible to do it.

Mr. Burrows,—

I have very much pleasure in seconding this motion before you. As Mr. Patterson is so well versed in this subject, I think it would be well to have him draft a paper and send same to the government.

Motion passed on by all present.

At a meeting of the Central Railway and Engineering Club of Canada, held in Toronto, March 19, 1907, a paper on "Technical Education for Mechanics" was read by Mr. Robt. Patterson, Master Mechanic of the G.T.R. shops, Stratford. At this meeting were present a large number of steam and electric railway men and representatives of other industries. The paper was thoroughly discussed by the meeting. The pressing necessity of a forward movement on the part of the government in regard to technical education was strongly endorsed. The following resolution was passed and the Secretary was instructed to forward a copy of the resolution to the Minister of Education of Ontario and to the Minister of Labor of the Dominion Government.

Moved by R. Patterson, of Stratford.

Seconded by Acton Burrows, of Toronto.

That in the opinion of this club, the time has arrived for the Government to give a thorough consideration of the question of technical education in this country. Up to the present, no move has been made in this direction and no time should be lost in giving the matter adequate consideration.

Mr. R. Preston, Master Mechanic C.P.R.,—

Before adjournment I vote a very hearty vote of thanks to Mr. Patterson for his paper.

Seconded by Mr. Baldwin.

Adjournment,—

Moved by Mr. J. C. Garden, seconded by Mr. Preston, that meeting be adjourned.

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