

PAGES

MISSING



.. THE CENTRAL ..
Railway and
Engineering
Club

OF CANADA

OFFICIAL PROCEEDINGS

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MEETING OF THE CENTRAL RAILWAY AND
ENGINEERING CLUB OF CANADA

COMMITTEE ROOM, HOTEL CARLS-RITE,

TORONTO, December 22, 1914.

The President, Mr. T. J. Walsh, occupied the chair.

Chairman,—

Gentlemen: We will call the meeting to order. The first order of business is the reading of the minutes of the previous meeting. You have no doubt all read these minutes, and it will be in order for some one to move that they be adopted as read. Moved by Mr. G. Baldwin, seconded by Mr. J. Wright, that the minutes of the previous meeting be adopted. Carried.

Chairman,—

I will call on the Secretary for the list of New Members.

NEW MEMBERS

Mr. E. J. Murphy, Asst. Locomotive Foreman, C.P.R.,
Toronto.

Mr. J. W. Dodds, Machinist, C.P.R., Toronto.

Mr. G. Baldwin,—

I move that they be accepted as members.

Mr. J. Wright,—

I second that. Carried.

MEMBERS PRESENT

E. A. Wilkinson
Chas. Geldart
Geo. Baldwin
W. Walker
J. M. Clements
G. S. Brown
John Egan
A. E. Price
Geo. M. Smith

M. A. Humber
Jas. Herriot
James Wright
J. S. Grassick
W. T. Brazier
E. J. Murphy
A. E. Till
Chas. Russell
T. J. Walsh

W. M. McRobert
Robt. Patterson
J. H. Morrison
W. C. Sealy
Thos. Graham
J. W. Dodds
R. E. Port
F. W. Slade
K. McRae

J. Douglas
 Jas. Barker
 J. Anderson
 E. Logan

Geo. H. Boyd
 C. DeGrouchy
 C. A. Jefferis

F. R. Wickson
 W. McRae
 J. W. McLintock
 J. Reid

Chairman,—

I believe Mr. Morrison has a message for the members.

Mr. J. H. Morrison,—

Mr. President, and fellow members of the Club: Before leaving for the meeting to-night I had a telephone message from Mr. Howard Fletcher, who is well known to most of the members of the Club for his genial disposition on the Committee of Sports and Entertainment. He has been ill and unable to attend the meetings for some time, and he asked me to wish the members of the Club, on his behalf, a very Merry Christmas and a Happy and Prosperous New Year. This message comes from him through me in a kind and feeling way, as I have been a personal friend of Mr. Fletcher's for many years. He has always been untiring in his efforts in any work in connection with the Club, and I think it would be quite fitting if some reply was sent to Mr. Fletcher on behalf of the Club. I do not think there is anything more I can say.

Chairman,—

There is no doubt that we appreciate the message from Mr. Fletcher, and although Mr. Fletcher has been unable to attend the meetings for several months on account of illness, when he is well again he will undoubtedly be here regularly. He has always done everything in his power for the betterment of the Club.

While I am on my feet, I might also say that I am glad to be with you again to-night. Four weeks ago, I did not think that I would ever be in your midst again, as I thought I was going to follow in the footsteps of our late Past President, Mr. Bannan; however, with the care of the doctors, I pulled through and surprised myself and many others by being up and around in such a short time.

Mr. G. Baldwin,—

I move that we accept the message we have received from Mr. Fletcher, and that a suitable reply be sent him.

Mr. C. Russell,—

I second that. Carried.

Mr. F. R. Wickson,—

I am satisfied that I am expressing the spirit of the members when I say that we are very glad indeed to have our President with us again.

Chairman,—

I thank you.

The next order of business is the Election of Officers for 1915.

Mr. R. Patterson has been nominated for the office of Honorary President again. We are only too pleased to have him in that office, and I am sure he will be glad to fill it.

Moved by Mr. J. Wright that the nomination be closed.
Carried.

For the office of President,—

We have the name of Mr. J. Wright. Are there any other nominations? None. Then I declare Mr. Wright elected President for the ensuing year.

For the Office of First Vice-President,—

Mr. W. C. Sealy has been nominated for this office. Are there any further nominations? Hearing none, I declare Mr. Sealy elected First Vice-President for the ensuing year.

For the Office of Second Vice-President,—

I have the name of Mr. C. D. Scott. Any further nominations for this office. Hearing none, I declare Mr. Scott elected Second Vice-President for the year 1915.

Executive Committee,—

Messrs. T. J. Walsh, E. Logan, G. Boyd, A. W. Davis, J. B. Robb, Jas. Douglas and Geo. Smith.

Are there any further nominations? Hearing none, I declare these gentlemen elected to the Executive Committee for 1915.

Mr. C. Russell,—

I should like, if you would ask these gentlemen to stand up, so that we could see them.

Chairman,—

I would ask these gentlemen to stand up, so that they may be seen by the members.

Mr. R. Patterson,—

I assure the members that I appreciate very much the honor they have conferred upon me by re-electing me Honorary President. I am only too pleased to fill the office for them. Although it is not very often I am able to attend your meetings, and it may appear to some who are not very well acquainted with me that I am a silent officer, I am, however, frequently able to do something for the good of the Association.

I am very glad to see you here to-night, Mr. President, looking so well after your recent illness, and I want to extend to you my felicitations. If I remember correctly the last time I attended a meeting of the Club you were in the chair looking robust and hearty, and on that occasion I enjoyed the paper very much.

I do not think I need say any more just here except to again thank the members for the honor they have conferred upon me.

Mr. J. Wright,—

Mr. Chairman and gentlemen: I do not think that you need to hear anything from me to-night, as I am well known to most of you.

It is very pleasing to me to see Mr. Walsh back with us. He is an old friend of mine; we served our time together and worked side by side for many years. I hope he will be spared to attend the meetings for a long time to come.

Mr. W. C. Sealy,—

I do not know as I have anything to say, but to thank you for electing me First Vice-President for 1915. I am not able to be here a great deal, but I will have to endeavor to get to the meetings more often in future.

Chairman,—

Mr. Scott is not here to-night. I understand he has just lost his father, and that probably accounts for his absence.

Mr. J. Wright,—

On behalf of Mr. Scott, I would like to say you can all bear it in mind that Mr. Scott is a worker, and has always done everything in his power for the Club.

Mr. C. Russell,—

I hope you will pardon me for asking that question, because

I did want to see the new officers; this is such a splendid organization, and I learn something every time I come here.

Chairman,—

We have with us Mr. M. A. Humber, who has come from Stratford to read us a paper. I will now call on Mr. Humber.

Mr. M. A. Humber,—

I am sure it is a great pleasure for me to come here and read a paper this evening. I am not a total stranger, although I may seem such to many of you. On the previous occasions when I attended your meetings, I enjoyed the papers very much, and I hope that my paper will be of interest to you.

SYSTEMATIC SPECIALIZATION OF SHOP WORK

BY MR. M. A. HUMBER

Apprentice Instructor, Grand Trunk Railway, Stratford, Ont.

The writer of this paper comes before you for the first time in the capacity of a contributor to the papers of this club, and when asked to give a paper for to-night's meeting, and being given any subject to choose from, the subject of systematic specialization of shop work appealed to me as being one from which a good deal of information on shop practice could be obtained, and possibly some interest manifested. The subject has been treated by me in as general a manner as possible, no information has been obtained from other sources where systems of this kind have been working, or have been written about, and I will endeavor to lay before you in a plain, practical, every day shop talk, a system with which I am at present connected myself, which we feel has considerable merit and is easily applied to ordinary shop practice.

The diagram on the board shows modern repair shop organization, and I will endeavor to practically outline the system as shown on this cut, and its advantages:

You will notice that the cut shows practically what might be called a shop military organization. All the captains, who are the foremen, report to the general, who is the master mechanic. Chargemen, or lieutenants, of each department report to the captain and the privates report to the chargemen, or lieutenants.

There have been numerous writers on this or similar subjects, and some systems have been put into practical operation with reported excellent results, both in increased output of work, and reduction of expenses. Some of these systems have been installed at a large initial expenditure, and require a large annual expenditure for their maintenance, and yet under these conditions, it is claimed that the system has been a good investment. The object of this paper is to lay before the members a system of specialization of work which is daily being practically demonstrated to be both successful in increased output and efficiency of output, at a great reduction of cost, and being maintained at a minimum expense. It should be understood that local conditions, class of work, etc., always enters largely into manner of exact system to be adopted, and generally any system of this nature is more likely to be adopted if it can be applied by the firm or corporation themselves, than if they have to import a scientific or special staff to inaugurate or manage same. As I am most interested in railway work, the paper will more generally treat along those lines of shop practice, but it should be borne in mind that same principles would apply to any manufacturing establishment, and perhaps more particularly so where the work is chiefly of one class. To commence with, even if the shop is working under a different system, if it is intended to carry out the specialization method, shop machinery, tools, etc., should be so arranged to conform with this system, and the staff should be divided up into special gangs, each gang being kept to take care of its portion of the output. To take a railway shop as an example: In the Machine Shop the gangs should be divided up about as follows:

Gang: Main and Side Rod, Valve and Piston, Axle Box, etc., Motion, Wheel, Bolt, Brass Finishing, Air Brake, Tool, Drilling, General;

ERECTING SHOP:—*Gangs:* Erectors, Steam Pipe, Valve and Slide Bar, Shoe and Wedge, Cylinder, Mountings, etc., Strippers, Hoisting, Rebuild;

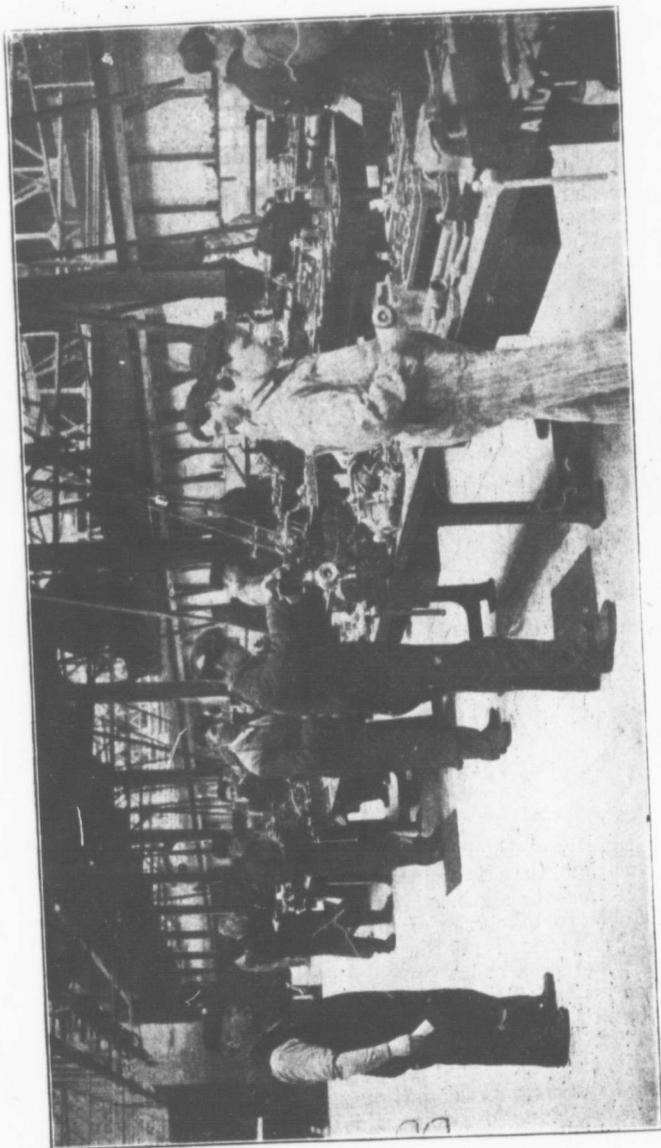
BOILER SHOP:—*Gangs* on new work, that is new firebox work, which would include all the necessary work on new work divided up into specialists for each part of it: Riveters, Caulkers, Taking out tubes and putting in tubes, Fitters of smoke box netting, plates, etc., Tube Welders, Sheet Iron;

BLACKSMITH SHOP:—*Gangs:* Forge, Bolt, Springmakers, Frame Makers, Repairers, and other specialists as far as work will permit.

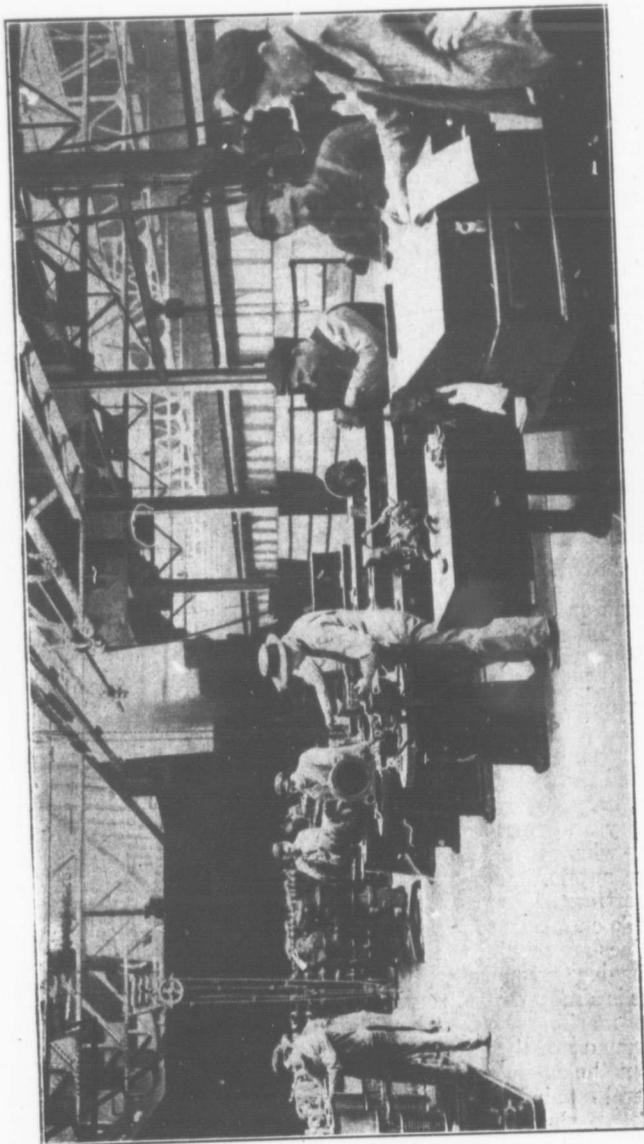
TENDER SHOP:—*Gangs:* Truck, Frame, Tank Repairers, Riveters, Carpenters;

PAINTERS:—*Gangs:* Lettering, Striping, Varnishing, General Painting, Cleaning;

PIPEFITTERS:—One general gang on general work.



SPECIAL BRASS GANG FINISHING DEPARTMENT

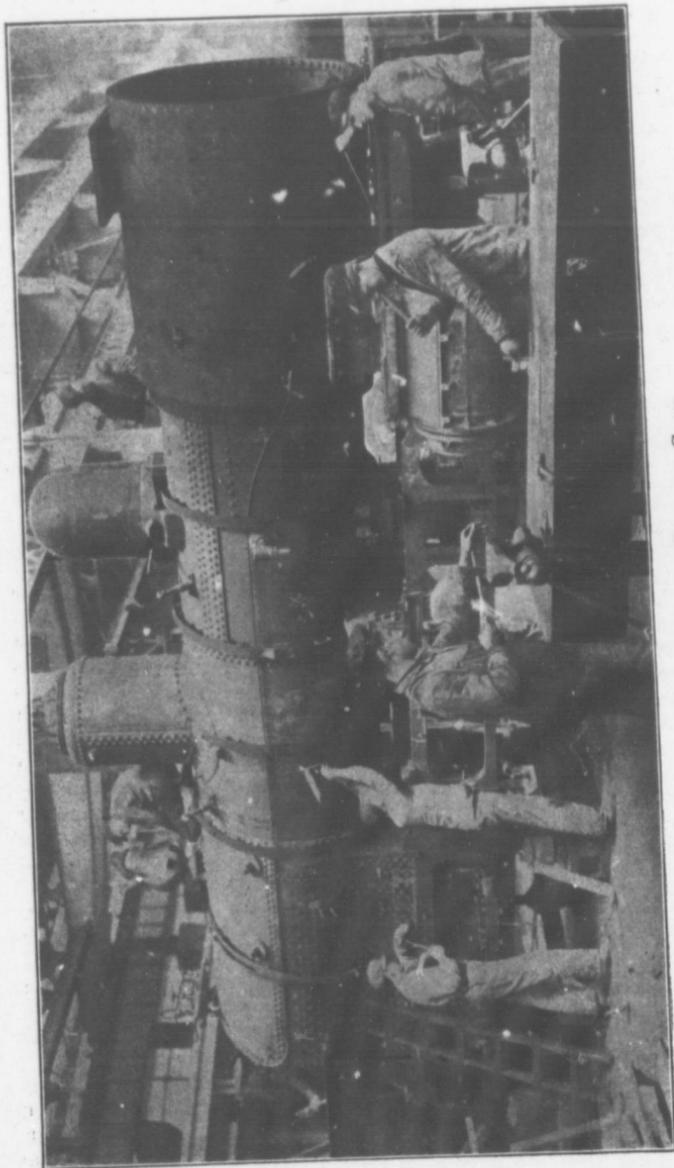


SPECIAL GANG, AIR BRAKE DEPARTMENT

one machine or department to another. When you specialize work in different gangs or departments, as before stated your men become thoroughly acquainted with work they are doing, they are able to look ahead for stock material, and as a rule they are concentrated on that one class of work and are able to figure out the tools or templates which will enable them to do the work more expeditiously. This is more readily done than if they work from one different class of work to another repeatedly. With this system there should be inaugurated a first-class layer-out or template room, so that blue prints when they come to shop should be sent to template room and checked and all templates made that are necessary. This prevents employees spending time over blue prints in shop laying out work, instead of which they simply get templates where necessary and apply them either for machine work or for work that may be required. One of the best foundations for shop practice is to have a good layer-out and template room.

As all men are not equal in ability it is not always necessary for a man to be a first-class mechanic to become a good specialist, but it is a good principle to have a first-class skilled man at head of each gang, and a second man following up, in case position becomes vacant at any time, so that in conjunction with this specialization it is of good advantage to have an apprenticeship system and when apprentices are admitted they should have a fairly good education and be in good physical condition to justify their being employed and trained as mechanics. The apprentices should be put through all the different departments and gangs as far as practicable, a proper record kept of them, and when a charge hand is required you would always have a corps of well trained young men to fill any of the positions. The apprentices should only be specialized after coming out of their apprenticeship and after having received a thorough all-round training. Consequently it is necessary to extend the apprenticeship longer than three or four years when apprentices are to get this training. In the shop where I work the course extends to five years, and in that time apprentices get training in both machinery and fitting departments.

To enable us to specialize in our erecting department when engines are rebuilt, that is, when new boiler is being applied to an engine, it is usually put into what is called a Rebuild Gang. This is almost entirely composed of apprentices who move over from machine shop. They start in this gang and get general all-round erecting work. After these engines are prepared to about the extent that an engine is in when it comes to shop for general repair, it is handed over to the erecting gangs to complete, so that as a rule the main erecting gangs are always turning out general repairs, which is one line of work. If an



SPECIAL APPRENTICE REBUILD GANG

engine requires a new cylinder a special gang applies that, erecting shop doing balance of the work. After the apprentices are out of their time in rebuild gang they are then sent over to some other gang and become specialists until some further promotion takes place.

To make this system still more perfect it should be worked in conjunction with contract. All the gangs should be put on contract, and where possible, individual contract. By contract, I mean that every man should be guaranteed his day's pay or rate per hour, then when prices are fixed he should be able to make as much more as possible over his regular day's pay. In some cases the work may be such that it is necessary to work collectively in gangs, but a very large percentage of this work can be done on individual contract. This gives the best man an opportunity of making the best pay, and has a tendency to increase the output. It also has a tendency to maintain a good standard of work. Where any work is rejected or to be done over again it is a loss to the operator. Where our gangs are working on individual contract and have a chargeman, the chargeman is paid a high rate and does not receive any contract, so that his whole time is devoted to maintaining or increasing the output and particular attention paid to having work efficiently done.

To facilitate the work and help all the different gangs in the shop that are working along lines of output, a list is made up each week of locomotives that are to be turned out the following week and a preparatory list for the second week. These lists are issued to foremen of all the different gangs, showing dates on which engines are to leave the shop, and the date on which work from each department will be required. It not only enables them to get work ahead for engines to be turned out the following week, but also enables them to look ahead for preparatory list, and when special work is required or extra heavy work, they are enabled to advance it. The foremen in turn give each chargeman a copy of schedule (sufficient being made out for this).

When alterations to machinery or other work is necessary, circulars are sent to foreman, who sends one to each of his chargemen interested, this saves foreman office work, and insures chargemen being properly notified. Each chargeman keeps a circular book so that if he is absent or promoted, the next man in charge, or his successor may post himself on alterations, etc., by perusing former circulars.

All inspectors should report direct to the Master Mechanic. Not necessarily all minor matters, but all such cases as he thinks need special attention, and where a ruling is required in special work, and in working contract, inspectors are required, but not more so than when men are working day work.

To facilitate the work and keep charge hands at work as much as possible, a work chaser is a good man to have. He keeps tab on progress of work that is to be turned out, and if he finds some particular branch is going to be behind, he immediately calls foreman's attention to the fact, whose duty it is to look after the work in question. He also sends a general report to Master Mechanic each morning, especially mentioning any particular work requiring attention, also gets list of material not being promptly supplied by Stores Department. He is supplied with special forms to fill in, so that the clerical part of the work is reduced to a minimum. As it is necessary for all chargemen to give a detailed report of repairs executed to parts, or new work, they are responsible for, forms are printed so that they just require to fill them in, so as to avoid their time being taken up with clerical work.

A special committee on safety appliances is selected from the different gangs, who meet once a month when reports are read and necessary action taken.

A Fire Brigade composed of five companies selected from the different gangs is an organization with full equipment of fire apparatus, drilled regularly by their respective captains. While this information may seem a little foreign to the title of the paper, yet it shows a complete system of special organization should exist in conjunction with the other practical work which goes to make the whole system complete.

In conclusion would say that in the specialization of work to maintain it efficiently and to get the best results, a good apprenticeship system maintains capable leaders and a good contract system stimulates the employees, and thus makes it complete.

Chairman,—

If there are any questions which the members would like to ask they are now at liberty to do so.

I would call on Mr. Geldart of Stratford to say a few words.

Mr. C. Geldart,—

Mr. President and gentlemen,—

The subject I think has been covered very fully in the paper read to-night. What I would like to place emphasis on in connection with this system of specialization is that each particular line of work should be specialized and specialize the work in each department. We have found this plan to be of great advantage. For instance, our jigs and fixtures are specialized for each shop and each machine. This not only increases the output and makes reduction in cost of production, but stan-

standardizes work and keeps parts interchangeable. I might call your attention to one instance. We have a system of producing bolts in the Bolt Department which is no doubt a wonderful reducer in cost. We use all taper bolts on our locomotives. All bolt holes are reamed out by standard reamers to gauges, the size being stamped on gauges every three inches. Bolts are ordered from Bolt Department giving length and size. Bolt Department fits bolts to block gauges which are kept standard by set of master gauges and reamers. This system does away with all calipering of holes and time consumed by operator having to go to Erecting Department to get sizes. This specialization is carried on in each department. In Machine Shop we have about fifteen gangs and we follow them right up on this system and see they are living up to it. When any new parts are adopted on locomotives, we get after jigs and templates and specialize each detail of the work.

We have also found it an advantage to have all machine work for engines in Erecting Shop ready a week ahead and in this way any unforeseen delay is prevented. I do not think I have any more to say, but if there are any questions members would like to ask that I can answer, would be only too pleased to do so.

Mr. G. S. Browne,—

I would like to ask our friend here what he means by contract labor. Is that the system where a man gets a contract and then goes out and hires a lot of men to do the work? In other words, one man gets the contract, and the others the labor.

Mr. M. A. Humber,—

In regard to contract labor: in our shop, most of the men are working contract now. There was a time before the system was up to the standard it is now, that the men were not as anxious to work contract, but now if a man is not on that system he will go after the charge hand and not rest until he is working under that arrangement. We do not hear of any men who are on contract wanting to get away from it. I think that speaks for itself. When the men themselves are satisfied, that is sufficient recommendation for the system. As to going into it a little more minutely, I do not know that I could explain it any more clearly. When men working contract are quite satisfied themselves, it is enough then to know that it is a good system. I am basing my assertions on Stratford shop and I maintain that the system there is perfectly satisfactory.

Mr. J. Wright,—

I would like to say a word on this subject. I think, while specializing men produces more work for a shop, it is a great disadvantage to the mechanic.

If you take a mechanic and place him on one job for years, when he comes off that job he will probably be expert in the line of work he has specialized on, but put him at something else and a "green hand" could do better.

I remember a man who came into the shop where Mr. Walsh and myself were employed. He had been fitting links for years. He could fit two pairs of links on a locomotive faster than an ordinary man could do one pair, but put him at another job, and he was practically useless.

I think that this is the great disadvantage of specialization. Keeping a man on one class of work for a number of years is going to make him forget a whole lot of his general mechanical knowledge.

Mr. M. A. Humber,—

Of course, it should be remembered, if a man is competent he will not be on one class of work too long. He will be advanced. It should be understood that an apprentice is not specialized until he has completed his apprenticeship and has received a general mechanical experience.

Mr. W. C. Sealy,—

I have been an interested listener to the paper this evening, having come from Stratford where I have seen the system in force. Possibly some of the gentlemen who have asked questions have not quite grasped some of the points of the paper and are not familiar with the details of the system, which would of course still leave them somewhat skeptical.

There is one point; the system outlined in the paper could not, of course, as it stands, be applied to all shops, but taking local conditions into consideration, it should be possible to adapt it to any shop.

In regard to contract labor. I think Mr. Brown has not just grasped the idea of the contract system at Stratford. Contract labor is not contract labor in that sense at all. It is more in the line of piece work. A man gets paid his rate and he has the opportunity of earning say 25 or 30 per cent. on that. When he first starts on a job a man may not be able to earn contract over and above his regular rate, but after he gets a little practice he will be able to earn considerable contract money, that is, if he adapts himself.

It is certainly not to a company's interest to transfer a man

around a great deal, but notwithstanding that, a man will not remain on one job so long that he will get "rusty" on his other mechanical knowledge if he has good mechanical ability and tries to get along.

Mr. W. M. McRobert,—

Regarding this system of work specialization; I fail to see what would be the necessity of a man serving an apprenticeship, if he is to be employed on one particular class of work all the time. He could start quite inefficient and in a short time be sufficiently competent to do his special part of the work allotted to him, just as well as a machine, as, being an untrained man, his method is only mechanical. When a man applies to you for a position as a mechanic, is he required to produce proof that he has served an apprenticeship at his trade, or do you take him at his word? I could quote several instances where handy men are working as mechanics, at an inferior wage, who should really be employed in their own sphere, i.e., a helper. A manufacturer cannot hope to produce satisfactory work where this class of labor is employed. In the shop where I served my apprenticeship, a mechanic was not allowed to start work unless he could definitely prove that he had learned his trade. It would be of mutual benefit to the employer and employee if that system was made compulsory in Canada, as the former would get a better product, and the latter a higher wage.

The other day we had occasion to send to an engineering firm for an engine exhaust valve plug, an iron casting weighing about 40 pounds. This piece of machinery was supposed to be delivered to us ready for immediate use, and in order to facilitate this a duplicate of the required part was forwarded the above firm. The valve plug was duly received and when we came to try same in the engine valve chest we found the plug was about one-thirty-second of an inch too large. This necessitated about ten hours hard work filing the plug in order to make it fit in its required place. We naturally communicated with the firm who supplied the above part and they replied that it was impossible for such a mistake to occur as the work was done on a specialized system. The old way of making machinery may be antique but it is most preferable when results are required.

Mr. M. A. Humber,—

Probably the shop this plug came from had not the advantage of inspectors.

Mr. F. W. Slade,—

I have been in charge of several machine shops and I have

invariably found that a mechanic of the old school, one who has learned his trade in the old way, can always eclipse these others, especially when leaving one place to accept another position.

Mr. Jas. Herriot,—

I think that the subject has been very ably handled by Mr. Humber, and I would like to say a few words with reference to the system and its connection with the Stores Department. I find that the specialization benefits the Stores Department, inasmuch as we know just who to consult in regard to the supply of any class of material, also that any workman who is in charge of special work is always anxious to see that the storekeeper does his part and keeps sufficient material on hand to supply his needs.

Our system of storage of material is also such that material is stored as near the point of production as circumstances will permit.

Mr. T. J. Walsh,—

I think we should hear from Mr. Patterson.

Mr. R. Patterson.

I think a paper which creates a diversity of opinion like this one has, cannot be considered other than a successful one. A paper that brings out such a hearty discussion must be of some benefit. I am very pleased to see that Mr. Humber has accomplished this.

A large shop can specialize on different classes of work and it depends a great deal upon the classes of work how far that specialization can be carried successfully.

In a very small shop it is a little difficult to specialize to any extent especially where the work is of a varying kind, but even then it should be done to as large an extent as possible, as it would make even a smaller shop more efficient.

Regarding the contract system. In the first place when you start a man on contract you want to pay him a fair wage, pay him as good wages as other mechanics are being paid in your locality. After that you want to make your prices fair. You do not want to take a man who can do the work the quickest and base your contract on his working capacity, but take a good average man and make that your standard. This gives every man the chance he deserves. A man who cannot make contract will endeavor to improve himself to such an extent that he will be as good as the average and the first class man will be able to make the highest wages, which is only fair, as the man who can do the most work should receive the most

remuneration. If you are hiring a man to do machinist work, when you bring him into your shop you would expect him to be a machinist, because you intend to pay him machinist wages, and though he may not be able to earn contract money for a short time, he will soon endeavor to improve his methods, which will enable him to make a good percentage over his daily rate. It is to be understood that a man when rated is paid that rate per hour for his work no matter whether his contract comes to that or not, so that he always gets daily or hourly rate promised him, then he may make sufficient contract to bring his rate up to such percentage as he is capable of making.

One of the important points in our shop arrangement is a splendid apprenticeship system. A boy before he is taken on as an apprentice has to have a certain amount of education to start with, has to be physically fit and able to pass a medical examination. We take these boys and give them thorough technical education for five years. They attend classes for two nights per week, where subjects of practical mechanics and mechanical drawing are taught them. The teachers, the room, light, material and everything are found by the company, apprentices only requiring to purchase their own personal drawing instruments. In their five year period of apprenticeship a boy is given a good practical education in almost all branches of the trade, so that when you want to advance a man into a position as chargehand, etc., you always know where to find him.

It should be borne in mind that when we take on a mechanic we probably do not expect him to be able to do as much as men who are specialists in the shop, but if after a short time he does not improve, he is dealt with the same as any other incompetent man is dealt with in a shop that is working day work, but I assure you it is much easier to spur a man up to become a better man when he has prospects of being able to earn 35 or 40 per cent. contract in addition to wage which he started at.

In regard to specialization of work. I expected you were going to raise that point to-night, in regard to a man remaining on one job a considerable length of time. One great advantage to the employees and particularly to the company is that when a man gets old in the service you can take him off heavy work and specialize him on light work, so that his experience enables him to hold his own although he may be competing with younger men. A man does not "lay down" because he becomes a specialist for a time. If he is a mechanic he gets machinist work and he gets promotion as he merits it and opportunity offers, just the same as he would in a shop that has no specialization if he adapts himself and is worthy of promotion. Of course there are some men who do not make any effort and become satisfied wherever they are. These men do not look

for promotion and very seldom get it. I have never found that specialization interferes with a man's ability and promotion if he is a first class man.

In addition to specializing work we have what is called a General Work Department and if any of the departments become congested with work, the work is handed over to the General Department to be attended to and help out.

In regard to the question as to how one can ascertain whether a man who applies for a position as a mechanic is an actually qualified machinist. I will guarantee that as soon as our foremen or men in charge of gang see a man handle his machinist tools they would know whether he was a mechanic or not. If he cannot handle the tools properly you will find he is not as a rule a very competent machinist. When you have ascertained he can do this, you are pretty safe to put him at any class of mechanical work. There may be some parts of it that he has specialized in that it would be an advantage to put him at. If not you can start and specialize him at once, and he will become thoroughly competent in a short time.

There are a number of the members who have never visited the shops at Stratford and I take this opportunity of extending an invitation to any who happen to be in the vicinity to call and go through our shops. While we have not the largest shop in America, we have one of the most up-to-date railway shops that is in working order at the present time.

Under our system of specialization the output is good and the employees earn good wages.

Mr. C. Geldart,—

I would like to try to answer Mr. Wright's question. He claims if a man is kept to one line of work too long it would be detrimental to him and cites the case of a man who could set up two sets of links to another man's one, he having been on link work for some years. That man I would say was not a first class mechanic.

Mr. J. Wright,—

He held a certificate covering seven years' apprenticeship in the shops of the London and Lancashire Railway.

Mr. C. Geldart,—

Well, if he was working for me, I would not consider him a first-class mechanic.

Mr. J. Wright,—

My experience has been different. In my opinion, if a man

is off a lathe for fifteen years, when he tries lathe work again he will be worse than a beginner.

Mr. C. Geldart,—

With regard to Mr. McRobert's question of receiving a spoiled plug from the shop on account of being an improper fit. I don't think any shop claims that all its employees are infallible. There may be a number of first class men in the shop and one may occasionally make a mistake as perhaps was done in this case, and if the man were a specialist, it could not be said that the system was at fault, but that error was due to some little miscalculation on part of mechanic, or it may have been due to some wrong instructions given.

With regard to Mr. G. S. Brown's query as to contract system. The contract is not given to any individuals who hire their own men, but the price is for individual work which men in gangs are doing, and the man who earns the money gets it. There is no separating of contracts.

Chairman,—

I think this paper has been quite thoroughly discussed and has been very interesting to us all. I am glad that the discussion has been brought out so well on both sides, pro and con.

Moved by Mr. J. Wright, seconded by Mr. C. Russell, that a vote of thanks be extended to Messrs. Humber, Patterson and Geldart for coming from Stratford to attend this meeting to-night, and to Mr. Humber especially for the trouble he has taken in preparing this paper. Carried.

Mr. M. A. Humber,—

I am sure I appreciate this vote of thanks very much, and I am also very glad that you have coupled with my name that of Mr. Patterson and Mr. Geldart, as they have certainly handled a considerable amount of the discussion.

Chairman,—

We require papers for May and September of this year, and if any of the members would like to give a paper themselves, or are acquainted with any one who will give one, they will greatly oblige by getting in touch with the secretary, Mr. Worth.

At the next meeting, January 26th, we will have a paper on "Electric Lighting of Railway Cars," by Mr. McNab of the Electrical Engineering Department, Canadian Pacific Railway, and we are anxious to have a good turn out. Hope you will all come and bring your friends interested.

Meeting adjourned at 10:45 p.m.