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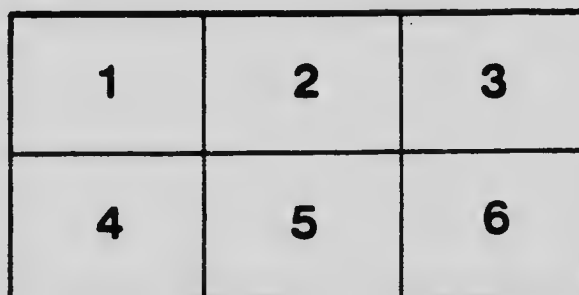
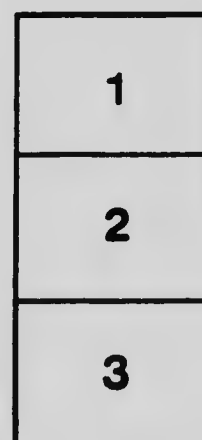
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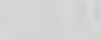
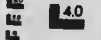
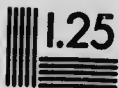
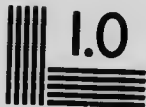
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Canadian Pacific Railway Company

Wm R. ...



Proceedings

of the Meeting of

Western Lines Officials

Held at

Field, B.C.



February twelfth and thirteenth

nineteen hundred and six

Canadian Pacific Railway Company



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OPENING ADDRESS

BY W. WHYT

SECOND VICE-PRESIDENT, CANADIAN PACIFIC RAILWAY

There is nothing novel about such a meeting as this in territory under my jurisdiction, as I understand that Officers have frequently called conferences of those acting with them and this widening out of the idea was adopted by myself to permit of an exchange of idea and experience of all the principal Officers and in order that by personal contact with those occupying similar offices and with those in other Departments, a better understanding and improvement might result, as well that a more profitable administration of the different departments of the railway might result to the Company.

The Calendar year which has just closed has been, in my experience, by far the most successful in the operation of Western Lines, with respect to the volume of business handled and particularly in the improvement made in most features of its transportation, increased tonnage and reduction in the expense of transport, as well as the improvement in the passenger service and the handling of package freight and I think, also, from the fact that there has been less disturbing of the car and power supply during the movement of the wheat crop in districts not directly affected by that movement.

There has also been an improvement in the carrying out of work authorized by appropriation and in the building of new lines, much of the work having been hurried through and in use, and the equipment employed thereon made available for the handling of the wheat traffic.

The disturbing factor that has given myself and the Operating Officers most grave concern has been the frequency of serious accidents and one of the most important considerations that led to my calling the present meeting was to see if by conference we could gain additional knowledge how to combat the influences or circumstances that lead up to this most regrettable feature of our operation. Notwithstanding that we are working under a set of almost perfect rules and have gone to the greatest amount of trouble to educate our men to a knowledge of them, we are yet without that benefit which should have accrued to us from the adoption and grounding of this knowledge into the minds of employees.

I have urged most particularly upon all concerned the exercise of the greatest care in selecting men for the Telegraph, Engine and Train service and have pressed as strongly upon Officers supervising these Departments to keep their men in an up-to-date knowledge of the rules pertaining to their duties and particularly to notice their habits. I have felt that selection, character and obedience to the rules are the features that lead to safety, leaving only that chance which we cannot guard against—error in judgment.

Apart from this, the matters that I look for the most improvement in, this present year, are, first, The time of our passenger trains, accelerating their speed as far as the track conditions will permit and cutting out all dead time at stations, also the education of the Enginemen so that they will make greater effort to maintain their schedule or to recover time lost prior to their taking hold; second, The Fast Freight Service; third, The car supply for points distant from headquarters; fourth, The hurrying home of foreign equipment. In no account in our expenses have we made such an improvement as in this, but it has not yet reached my expectation.

I would urge upon all concerned to curtail their correspondence, doing as much of their business as possible in personal contact with their Officers, thereby leaving more time at their disposal and hands unfettered for originating improvements in the handling of traffic.

I would urge, now that the rates paid in all Departments have gone up so much in the past two years, that we should take every means to cull from the service all who are not fully capable of giving service equivalent to the rates paid and a continued and improved economy in the employment of men in all branches of our maintenance work.

This Company has been the pioneer of business enterprise in the west and it is essential that it should retain the lead, both in its methods and in its administration of them. This is no small task when we think of the great increase in the wealth of the country, which has attracted so many shrewd men from many countries, the fusion of whose business wits has done much to greatly stimulate trade. No matter what competition we have in the future, this Company's railway must always remain the main artery through which the trade of the west will pulsate. If the Officers and men of this Company will see that all the business offering to it is taken care of promptly and that all its scheduled trains, whether they be passenger or freight, are run strictly to schedule and that that fine courtesy on the part of its employees, for which this Company is so justly celebrated, is maintained, we have no need to be alarmed at the advent of any competing lines and I would urge upon all that they leave no impediment in the way of accomplishing this result.

How to Improve Our Passenger Service

BY R. MARPOLE

GENERAL SUPERINTENDENT PACIFIC DIVISION CANADIAN PACIFIC RAILWAY

The task has been allotted to me of preparing a paper for presentation to the General Meeting of Officers of Western Lines on the important subject of "How to Improve our Passenger Service—Operating Officers' Standpoint," and I very much regret that absence in the South for a month on a vacation and recent return, together with pressure of business since then has prevented me dealing with this subject as exhaustively and intelligently as I would wish.

As a preface to this paper I would like to congratulate most heartily our Second Vice-President Mr. Whyte, on the assembling of all the leading Officers of the great system of which he has charge—it is almost a unique step in any railway practice—and is certainly an innovation so far as concerns the Canadian Pacific—congregating all the leading Officers in this way for conference, embracing consultation on and discussion of practical methods appertaining to the operation of this railway, and which intimately concerns the general interests of the Company and undoubtedly also those of our patrons—the public. And there is another feature in the calling of such an assembly—I refer to the fraternal aspect and character of the meeting; it is obvious that the fraternizing of the Officers, and establishing personal friendly relations, and discussions cannot but be to the mutual advantage of the individuals, and certainly to that of the Company.

There are three essential and important features in regard to the establishment and maintenance of an efficient and eminently satisfactory passenger train service. First is that of the condition of the roadbed of a railway—in this expression I, of course, include the track. Secondly, the equipment of the passenger trains, including the power, the heating, ventilation and cleanliness of the coaches. Thirdly, the manning of passenger trains with capable men—and the interesting of all employees connected with such service in the expeditious despatch of business relative thereto. It is not necessary now to deal with the subject covered by the first "essential," as this will be treated by some other Officer in a separate paper, but we can with propriety venture to point out that the preparation and compilation of the time table, which governs the operation of trains is intimately connected with the condition of the track, as relating to the speed at which the trains can be safely and comfortably run—I use the latter qualification advisedly, as there is an element of discomfort and annoyance to passengers in running trains over a track having a bad surface, and particularly where there is extraordinary sharp curvature. The writer has heard many complaints relative to the nervousness of passengers in the swing of long sleeping cars on curves, resultant of running trains at a faster rate of speed than the elevation of the rail provides for; elimination, as far as it is possible

and practicable, of this feature is desirable; the speed of schedule trains running on time, is governed and controlled by the time table, and granting that in its compilation due consideration was given to the character and physical condition of the roadbed in respect of the speed at which the train should "negotiate" a section of the line having a series of sharp curves, allowance must be made, either for "time" to be made up when trains are late, or run trains on time—or cease to do the former.

Equipment—I consider we have now individual passenger coaches that compare favorably with those in use by other transcontinental lines. In order to compare with and compete successfully with these Companies the standard and consist of our Imperial Limited or continental fast trains should be similar in character.

It is perhaps unnecessary for me to point out that we alone afford the opportunity to passengers to travel by one line across the continent, and it behooves us to make every reasonable provision to make such a long journey pleasant, entertaining and satisfactory in every way. There is, and always will be, a certain amount of tediousness in accomplishing such a long journey, and as pointed out to me, the only relaxation a passenger has, outside of ordinary literature and the magnificent scenery in the Mountains, is to take a turn on the platform when the opportunity is afforded them. The object of the Great Northern and Northern Pacific as well as the Southern Pacific, in providing a buffet and library car and combination parlor and observation car which are attached to their limited trains, is to relieve the tediousness of the journey and at the same time to afford their patrons a favorable opportunity of perusing interesting literature and gleaning information of moment to them covering connections and points of interest—scenic and commercial—along the line of railway.

The consist of limited trains run west of the Missouri River is as follows:

- One 14-section and drawing-room car.
- One tourist car.
- One combination parlor and observation car,
- One diner,
- One baggage,
- One mail and express,

—seven cars, and, of course, if the traffic demands it, another sleeper is attached, but no private cars.

CARS—It is a matter for the consideration of the Management as to whether or not we should provide accommodation equal to that of the Southern lines referred to. It is true we use observation cars on the Pacific Division, but this only embraces a small proportion of the distance covered on the journey—and, as a matter of fact, the physical characteristics of the Mountain journey whether viewed from the observation car or from a window of the ordinary car, are so attractive to passengers that time passes more rapidly than when passing over other sections of the line where the want of points of interest creates monotony.

An important feature in connection with the composition of our Imperial Limited trains is that of the power used on it—indeed this refers to all trains carrying passengers. There has been a tendency in the past to allot engines to fast passenger trains that were not in first-class condition—and what is, in our opinion, more condemnable, was the practice of running too few engines in such service. Altogether too much importance was attached to the mileage performance of such power, the result being vexatious delays caused by far too frequent engine failures. Experience has demonstrated that the practice of restrict-

ing the allotment of passenger power to the bare necessity is a mistake, and a costly and aggravating one at that.

And further—there is the absurdity of putting at the front end of a train (all of which in itself is a source of pride to the Company and gratification to our patrons) an engine which is not either in appearance or condition always fit to handle it. We must have the best of our power allotted to our fast passenger trains, to make it in keeping with the composition of such trains, as well as to avoid aggravating delays en route. If a man has one or more tally-hos in a city for the purpose of securing the patronage of visitors—tourists and the like, and he has competition for such business and desires to advertise and make a good name for himself, he does not put in front of it a horse affected with disease occasioned by overwork or natural defects.

I cannot too strongly emphasize the point I desire to make that we must have the best power available on passenger trains and particularly no scarcity of it, so as to give the Mechanical Department a fair and reasonable opportunity to attend to such repairs as are actually necessary.

Voicing the opinions of my Superintendents, "the first requisite to the successful and satisfactory operation of passenger trains is the condition and class of power used thereon."

"In our opinion the practice of using passenger engines in freight service, in order to make a mileage showing" is a vicious one, and "engines assigned to passenger service should be kept only for such service."

The heating, ventilation and cleanliness of passenger coaches are items of importance in furtherance of the object we have in view—that is, "improvement in our train service."

I fear that some of our conductors fail to realize the importance of a close and careful supervision of the work of their trainmen, both in relation to cleanliness as well as heating and lighting—they should make a periodical inspection of all the lavatories in the train, including the tourist and sleeping cars; we now have Sleeping Car Conductors, who will look after the work of the Porters, but the conductor of the train must be made to understand that this arrangement does not release him of the task of making a close inspection of all cars.

The poor ventilation of cars is a source of complaint by travellers, but, as is well known, it is a difficult task to satisfy every occupant of a car in this respect.

Regulating the heating of cars requires to be closely watched by the train crew—passengers may be made extremely uncomfortable by inattention or ignorance of the brakemen. With us, where we have such peculiar and rapid variations of temperature, it occurs to me that special drilling of the men is needed, and this by a competent man acting as Train Inspector. I will deal with this recommendation later under another heading—but as regards the points of complaints now presented and which it is necessary to debate or make improvements upon—I feel sure that a full and free discussion at this meeting will lead to the adoption of some suggestion and advice that will result in efficacy of service and satisfaction to our patrons.

MANNING OF PASSENGER TRAIN ENGINES:—The following excerpt from an article in the Railroad Gazette is interesting. "It is against public policy—an injury to the people of the state—that the railroad Superintendent should use any other than the best man available to run a locomotive of a fast express train." For the first few years all enginemen are in some degree uncertain quantities; but by the time these men are entitled by seniority to promotion as passenger engineers, their fitness therefor should be pretty well known to the Road Foreman, and through him by the Master Mechanic—I think we now have a loyal,

reliable and competent lot of men in the passenger service—and who are anxious to maintain a good record in the operations of trains. As a matter of course, the efficient and satisfactory movement of trains depends largely upon the Engineer—given a machine in good condition and not overloaded, and with a fireman with "brains as well as muscle" and especially a good article of fuel and water, he will cover the distance assigned to him as his run with despatch, and I might also add, with a certain amount of pride; but if he is not provided with a fireman equal to the work allotted to, and expected of him, and is also handicapped by the poor quality of coal, he naturally becomes worried and sometimes discouraged. The selection of suitable men for firemen generally, and especially for passenger trains is an important one; and such men should be possessed of brains "as well as muscle." I am satisfied that lots of delays of such trains have happened through the incompetency of the fireman. The subject of securing a better class of wipers and consequently good firemen, will be introduced at this meeting.

Respecting the passenger trainmen and the prompt movement of trains in their charge—we cannot claim that these crews are always as quick in their movement as they should be—with, of course, some exceptions, and this remark applies especially to the brakemen: It requires the greatest promptitude on the part of all engaged in the movement of passenger trains to keep them up to the standard required by the Management.

Undeniably there is some room for improvement in our passenger service—and the closest supervision of the work of the train crew as a whole. I am in favor of adopting the policy of appointing Train Inspectors, who should travel constantly from point to point on passenger trains, detecting and reporting, or posting men who are not properly performing their duties through ignorance or neglect. While it may be claimed that this is the duty of the Trainmaster or Superintendent, it is not possible for these Officers to give such close and expert attention to the work that it undoubtedly warrants; we have inspectors for nearly every departmental work, and it occurs to me that it would be to the Company's interest to "go one better" and copy the example of the Southern Pacific. We do not suggest that such an appointment shall embrace the work of inspecting one grand division only—as an experiment it should cover "All Lines West," and the result should decide further appointments of the kind. Personally I am satisfied that such a step would be in line of "improving our train service."

The appointment of Sleeping Car Conductors will assuredly remedy a lot of grievances and complaints made in the past by our patrons—and to my mind it is one of the best moves made to improve our passenger service. The train conductor is thereby afforded some relief, and has more time at his disposal to look after his brakemen and the running of his train.

The selection of suitable brakemen for passenger trains is a matter of importance—we should only engage men for this service who are fairly educated and have a smart appearance, and who are able to converse intelligently with passengers—this applies especially to that section of the line where we have something of interest to show our patrons. It is gratifying to state that our train employees are noted for their unvarying courtesy and politeness to passengers—and this is one of the many special features that has helped so much to make the Canadian Pacific so very popular with the public. The neat and natty appearance of trainmen is quickly noticed by, and pleasant to passengers—this remark applies to conductors as well as brakemen, and indeed the qualifications referred to in the latter should be more exacting of the former. It is a recognized rule that the Officers of our Steamship Department are to wear white shirts and black bow ties and boots—we do not always, but should, follow this practice as regards trainmen.

Branching off to another feature of this interesting subject of the paper "How to Improve our Passenger Service"—the first and most natural answer to such a query, and one which incidentally covers a lot of ground is to "Run the Trains on Time."

No railway can claim to be up-to-date and entitled to rank with other important systems until this end can be attained; that is running trains sharp on time at all points. While no human foresight or provision can always prevent the detention of trains, it is well known that a very large percentage of the causes are preventable—the use of defective power, poor fuel and water, over-loading, and a time schedule too fast for the runs to be made under peculiar conditions characteristic to the locality, are some of the causes why trains are late; We have as loyal and efficient a class of employees in our train and engine service as any other railway in America—and to further the improvement in our train service we must sustain them in their efforts to give satisfaction to and enlist the goodwill and favor of our patrons (the travelling public)—"by practising what we preach" providing proper power and good fuel and water, and the most expeditious means of supplying both the latter to the engine.

As pertinent to the subject of running trains on time, I would like to quote the following from an old copy of the Railroad Gazette.

"A letter in a recent issue of the Railroad Gazette to the effect that the average individual would rather ride on a train running on a slow schedule and "get there" on time, than start under the hallucination of high speed and reach his destination late is a reiteration of a remark that so many men have made before that it has become threadbare—yet there seems little hope of its ever reaching the eyes and permeating the brains of the men who have to do with the making of the time tables and control the movements of trains—the large percentage of late trains on American railroads make the close calculation a pure case of gamble—and high speed schedules a good deal of a farce!" Does it pay to advertise a fast schedule train that cannot or at all events is not maintained!" Aside from the dissatisfaction of the public, the annoyance must be great to the operating Officers and other employees concerned!"

And again in a letter to the Railway Age in December last a traveller writes: "I note with interest the communication printed in your issue of December 12th relative to keeping trains on time, believing this to be one of the most important railroad questions of the day. Success with which passenger trains are operated is brought home to the personal knowledge of a large portion of the populace of this Country."

The demoralization and confusion that undoubtedly follows the movement of continuously delayed trains is well known to most of us; it means a loss to the Company in other than the condemnation of the public. I refer to the delays to freight trains incident thereto, and might here add that where dining cars are not handled on the trans-continental trains, and meals are supposed to be taken at hotels or restaurants, when delays happen the result is most exasperating to the occupants—either too long a time between meals, or have to be taken at hotels or restaurants where no provision is or can be made to provide suitable meals; the only remedy for such a condition of affairs is to use a dining car on every train from Coast to Coast and by doing this we will "improve our passenger service." If trains are on time and the Mountain Hotels are not too overcrowded with visitors to supply meals to the train passengers except at the sacrifice of the regular guests, it is perhaps not necessary to haul dining cars over the Mountain Section—but judging from our experience of last year, it seems to me to be an important feature in our efforts to "improve our passenger service" to use dining cars over the entire run—Montreal to Vancouver.

It is a well known fact that passengers like to get out for a meal

and relaxation and to view the magnificent scenery at Field and Glacier when the opportunity is afforded them, but only at SEASONABLE HOURS.

Finally on this subject I may add that in my experience delayed trains, especially overland, missing important connections, and especially near the end of a long and at some seasons of the year, a necessarily tedious journey, creates more dissatisfaction and worry and causes more harsh criticism of our train service than almost any other features in it; given comfortable cars, for sleeping or sitting, good wholesome food at reasonably moderate prices, civil attention and delivery sharp on time at destination will ensure satisfaction to the passengers and a good name for, and be to the profit of, the Company.

There is one other source of discomfort to and cause of complaint by passengers which should and can be remedied. I refer to the stops at water tanks and stations, but particularly the former—the injudicious manipulation of the air brake in making a short stop at a water tank causes a violent shock to the train and consequent discomfort and alarm to the passengers.

Passengers are quick to detect and speak of disturbing shocks of the kind referred to—whether at stations or tanks, starting or stopping, and it behooves our Superintendents and Trainmasters as well as the Master Mechanic and Road Foreman to detect and promptly discipline enginemen who are guilty of a totally unnecessary act, and one which, I repeat, causes discomfort and alarm to our patrons.

In relation to the stops at water tanks, coal chutes and stations—I am a strong advocate of adding to the water tank a stand-pipe at the other end of the platform from the tank so that trains in either direction need make only one stop for station and water and thus avoid a cause of discomfort to the occupant of the coaches—we speak from actual experience in this regard having several stations on the Main Line of the Pacific Division so equipped. It stands to reason that the fewer stops made by an important train the greater is the satisfaction of the passengers. And while on this subject I may be pardoned, as it is perhaps extraneous, in quoting the following from that excellent journal "Railway and Locomotive Engineer":

"The aggregate for extra costs for stopping trains is considerable and the possibility of saving the expense is worthy of more consideration than it has ever received—the direct cost of the stops does not by any means represent the whole of the outlay—the wear and tear of driving tyres at starting deserves some consideration. The work which Mr. Peabody has done in directing attention to the cost of making unnecessary stops is highly creditable—the matter ought to have the careful and systematic attention of railroad officials."

The cost of stopping a train of 520 tons and returning it to a speed of 40 miles per hour was found to be 48 cents, the cost of stopping a 2,000 ton freight train and returning it to a speed of 30 miles per hour was found to be \$1.

And in conclusion perhaps I need not add that if we provide a water supply to our engines by the method mentioned and thus curtail the number of stops, the cost of the extra plant, that is, the stand-pipes and connections, will be more than covered in a short time by the wear and tear of the rolling stock and power and extra fuel used, as well as damage to the rails. I repeat again that lessening the number of stops is directly in line with the object we have in view—"the improvement of our passenger service."

I have not in the foregoing dealt with the duties of the station staffs in relation to the comfort of passengers and prompt despatch of all business having relation to the train service—I take it for granted that a paper will be presented by some other Officer on the subject of Station staffs—no doubt Mr. McPherson will deal with this in his paper.

I might, however, say that general civility and unvarying courtesy to passengers by ticket agents, baggagemen and indeed every employe at stations who comes into contact with our patrons are important factors in making our service eminently satisfactory and popular—failure to strictly observe and adhere to any of these essentials is bound to be detrimental to the interests of the Company and ultimately result in trouble to the offender.

I do not think that we can yet claim that we always provide the best of accommodations at stations for passengers—while we have done fairly well in this direction in the past, considering the immensity of the distance from Ocean to Ocean and the sparsity of population, it now behooves us to do somewhat better in this respect; as indeed it is necessary in order to generally improve our passenger service.

How to Improve Our Passenger Service

BY C. E. MCPHERSON

GENERAL PASSENGER AGENT WESTERN LINES, CANADIAN PACIFIC RAILWAY

The best argument and the most conclusive one that any railway has at its disposal to offer in securing passenger traffic is a good reputation. In order to have a good reputation from a passenger traffic point of view several features of the service must be pre-eminent, viz:—

Its equipment must be of the best quality and well maintained.

Its trains must be run on fast schedules.

Its trains must depart from and arrive at stations at exactly the time specified in the Company's time tables.

The consists of the trains operated should be such that all passengers carried should be furnished with proper accommodation according to the class paid for.

Its operating employes, from the conductor down to the colored porter, should handle passengers with the greatest courtesy possible and constantly endeavor to remove the many little irritating annoyances which makes travelling uncomfortable.

It would be well for us to analyse our service and find where there is room for improvement on some of the points mentioned.

Our equipment is of the best quality. It should be well maintained, particular attention being paid to the cleanliness of the cars both inside and out. Cars should not be permitted to leave terminals with dirty windows. While in transit conductors should see that their brakemen pay strict attention to the condition of cars, removing waste paper, orange peels, and such other articles as may be thrown on the floor by passengers, and on first class main line cars it should be the duty of the brakeman to wipe off the window sills frequently with a cloth so as to prevent the clothing of passengers from being soiled by coming into contact with the accumulation of dust which blows through the cracks. These little attentions of the trainmen create a very favorable and beneficial impression in the minds of travellers. The first class coaches which have wash basins should be supplied at terminal points with clean towels and soap, and it should be a designated portion of some employes duties to see that this equipment is furnished. All drinking fountains should have cups attached.

Fast schedules should be maintained where it is possible. It hurts our business and our reputation if trains are allowed too much time on branch lines. It should be our endeavor to get trains carrying passengers over the ground as quickly as possible and if conductors on branch lines have their time so arranged when it is necessary for them to take fast main line trains they will not require to have the importance of getting away from stations quickly impressed upon their minds. It is very necessary that our Transcontinental train schedules should be as fast as possible.

Running on time is something that does not need to be dwelt upon at any length. A railway which holds a reputation for running its trains on time is sure to have the confidence of the travelling public. All persons responsible for train movements should thoroughly understand the great importance of arriving at and departing from the various stations on their run exactly on time. It is very undesirable to have a schedule distributed in such a way that a conductor finds it necessary to wait at a station so as not to run ahead of time. Killing time on a train is most annoying to passengers.

The consists of trains should be carefully watched, particularly at terminal points, and sufficient accommodation placed on the trains to make provision for the accommodation of the various classes of passengers travelling on the train. Passengers who pay for their transportation should not be compelled to stand in the car aisle and every case where such a condition of affairs is reported should be thoroughly investigated.

Civility is one of the key-notes of the successful operation of passenger trains. The Traffic Department may spend very large sums of money advertising and soliciting traffic but when once that traffic is secured and placed on our trains it rests with the conductor and train crew to make the reputation which the Traffic men have assured the prospective passenger they hold. This is particularly the case in connection with those passengers occupying space in our sleeping cars and obtaining meals in our dining cars. An attentive conductor and a pleasant porter may do much to build up the reputation and the business of the Company. Our sleeping car service and its efficiency depends almost entirely on the employees in charge of the train. They can make or mar the pleasure of a trip. A special feature in connection with our sleeping car service should be noted and that is the prompt handling of telegraph messages with reference to space reservations. It is of the utmost importance that messages received at specified points from Sleeping Car Conductors should be promptly and accurately transmitted so that there may be no difficulty in locating passengers and furnishing correct information.

MR. W. BELL—The standard of our equipment now in service, and that which is under construction, is certainly of the best and equal to that of any of our competitors, and therefore its maintenance must be in the hands of intelligent and efficient employees. A large number of our passenger coaches, and the majority of our sleeping, dining and tourist cars are equipped with acetylene gas but the only points on Western Lines where gas can be obtained are Winnipeg and Vancouver. Cars running in through lines are liable to run short of gas, and in filling some lines we have to assign cars equipped with oil lamps. Therefore, to have a more uniform system in this respect an additional gas plant should be installed either at St. Paul or the most convenient point on our own line (Moose Jaw or Medicine Hat suggested) where cars operating in through lines may be recharged when the emergency arises.

The matter of our trains arriving at and leaving a terminal at the time specified in schedules is naturally one that should receive the closest attention of all concerned, yet at recognized points where cars are to obtain a further supply of ice, water, etc., there should be good, capable inspect-

ors, with sufficient competent staff who would be responsible for seeing that all cars in the train are ready for the road before a train is allowed to leave such points. It should be the duty of Car Inspectors at all divisional points to thoroughly inspect the closets and waste pipes in all cars, and when it is found that they are frozen apply the necessary remedy before the train is allowed to leave a point where proper facilities are provided. The train inspectors suggested by Mr. Marpole would be of considerable assistance in furthering this work.

Too little attention is frequently given to the tanks in dining cars being filled to their total capacity, resulting in shortage of water in kitchen and pantry at meal times, dishes piling up in the pantry, thus shortening up our equipment owing to there being no water to wash them.

A source of considerable inconvenience and complaint for some time past has been the manner in which ice is furnished to our cars; at many points the ice is thrown on to the platforms of our dining cars in large cakes, which break and are distributed all over, resulting in the platform being littered with small pieces of ice and even when swept up by our crews, the platforms are still wet and dirt is brought into the cars. This not only disfigures our equipment but defeats the object for which considerable amounts of money have been expended, viz., provision that has been made for icing dining cars from the top and into the refrigerators direct. Let more time and attention be devoted to the use of the facilities provided and this will certainly be a step in the right direction.

The working of the air-pressure system for watering cars is one that does not appear to be understood sufficiently by our employees, many of them being ignorant of the manner in which cars are to be watered and when they finally do stumble on to it, knowing that delay has already occurred, in their anxiety to get away, tanks were only partially filled. I would suggest that printed circulars of instruction be issued to all employees engaged in car work at divisional points in addition to such instructions being posted in conspicuous places where the men can see and read them.

The over-crowding and blocking of aisles in our cars with baggage has become a serious question. Trans-Pacific passengers holding a lower or upper berth, as the case may be, insist upon bringing large portmanteaus, hold-alls, tin trunks, etc., into our cars to the great inconvenience of the other occupant of the section, and in our tourist cars, in order to provide room for passengers to move about, I have seen baggage piled in the vestibule platforms. To overcome this I would suggest that the instructions that are now in effect that only such baggage as can be conveniently placed in a passenger's portion of berth be re-issued and strictly lived up to on the part of all concerned. Should a passenger with half a dozen large valises present himself at the train he should be informed that some of the baggage should be checked and if later on in the journey any certain articles should be required they might go into the baggage car and obtain them, but in this they should be given the assistance of the sleeping car conductors or porters in the case of sleeping car passengers, or trainmen in the case of coach passengers. The crowding of our cars with baggage is one of the largest factors in defeating the object we are aiming at—keeping our cars looking clean and tidy.

The matter of handling space reservations is one of greatest importance and every effort should be made to see that the information is promptly and accurately transmitted, as there is nothing so annoying to passengers as to find that after they have been advised they will receive accommodation, when the train arrives they cannot obtain it due to incorrect information having been obtained, or a delay in transmission. This has occurred quite frequently, and is occurring to-day, though the employees of the Sleeping Car Department were entirely free from fault. In the summer season I quite realize that our telegraph

lines are overburdened, and as a great deal of the difficulty has been in the mountains, I am inclined to the belief that better results would be obtained if a private telephone service were installed embracing Banff, Laggan, Emerald Lake, Field and Glacier. Information of the number of passengers who intend travelling could then be collected by a competent employee and telephoned to the agent at Banff, where guard sleeping cars are held throughout the summer season, and if it were found that there would be insufficient accommodation in the regular line cars, an extra car could be ordered by the agent at Banff. This would provide more intelligent information of the number of passengers expected and better govern the handling of extra equipment.

When through trains are running late, prompt telegraphic advice should be sent to the agents at Banff, Laggan, Field and Glacier of the time that trains would arrive at the various points named, more particularly Banff and Laggan where the hotels are so far away from the station, so that passengers may not have to wait around in disagreeable weather.

Under the present system of reservation of berth, an intending passenger will either personally apply or telephone to one of our ticket officers to reserve accommodation for a certain date, resulting in the diagrams being very quickly filled up. Some of these berths are claimed, others are not. It then becomes a very difficult matter to govern the ordering of extra equipment as when passengers present themselves at ticket offices who have not previously engaged accommodation, with a diagram filled with names, they are informed that they must apply to sleeping car conductors or porters for their accommodation. In some offices in the east, printed signs are displayed, advising passengers that unless accommodation is claimed and paid for at least ten minutes before departure of trains, it will be forfeited and I think this system should be in effect over the entire line.

Referring to Mr. Marpole's remarks concerning observation cars in our through trains. If it is the intention that they be operated, and they would be a decided acquisition, in their construction they should include bath and barbers' chairs in addition to other features mentioned. A point may come up in this connection as to how the baths should be regulated as, of course, we could not undertake to give every passenger in a through car a bath each morning as the water tanks would not permit of it. A nominal charge would naturally have a tendency to reduce the number of baths applied for, and if the adoption of some such system, as I understand, is in effect on ocean steamships, a bathing list, baths could be regulated in this manner. This is a matter which I should like to have discussed.

I must congratulate Mr. Marpole on his remarks concerning the introduction of sleeping car conductors, and I can assure you their work so far has demonstrated their decided usefulness in the direction of improving our passenger service. They are being trained very carefully and are being given the benefit of experience of the District Agents and Travelling Inspectors of the Department and the necessity of getting after porters and insisting upon keeping cars in a clean and tidy condition, ventilation and regulation of temperature is being drilled into them daily.

The personnel of employees engaged in sleeping and dining car service to-day is of very high standard and our reputation for efficiency and civility is considered above that of other lines. As our sleeping car conductors learn more of the road and the many points of special interest in the journey across the continent, they will naturally be called upon to mingle more with their passengers and point out to them the many interesting places, all of which will be a decided benefit, helping to make the trip pleasant and enjoyable to our patrons, and instead of the sleeping car conductors running over the road checking up and locating passengers they will do a lot toward making the trip a most interesting one. I, there-

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fore, bespeak for our sleeping car conductors all the assistance and support that can be given them by those with whom they come into daily contact in train service that the best results be obtained and the object for which they were introduced—the improvement of our passenger service—be accomplished.

There is another step in the right direction suggested by Mr. Marpole in his paper, the proposal to run our dining cars through from Montreal to Vancouver. This is certainly very desirable and past experience has taught us that it is necessary in the improvement of our service. I maintain that no dining car service in existence could be expected to do better than we did last summer. Very unfortunately, however, we will not be in a position this season to introduce the through service owing to insufficient dining cars to give proper service and provide necessary rest for the crews, but I cannot too strongly recommend that steps be taken to authorize the building of sufficient cars to put the through service in effect at as early a date as possible.

Mr. G. J. Bury,—There is room for adverse criticism in connection with the operation of our passenger trains. Our record would have been better last fall only that our passenger engines had to work to their limit all summer and we had no reserve power to meet an emergency. The traffic was sufficient to warrant the running of three instead of two trains per day across the continent in both directions.

In a recent trip through the United States, I found that passenger trains were hauled by either Atlantic or Pacific type engines, with sufficient reserve power to pick up some lost time.

Our engines in passenger service should be kept cleaner and so should our cars.

I consider the time has come to run a limited transcontinental train with observation car in addition to the two transcontinental trains run now.

Mr. R. R. Jamieson,—“With respect to engines handling passenger trains. Several years ago we had late trains running between Montreal and Toronto because the engines were worked to their limit. Heavier class engines of the Atlantic type were supplied and immediately there was a decided improvement in the record.

I agree with what Mr. Bury has said in regard to the care of passenger equipment. Of course, we have the porters of sleeping cars to look after the closets there, but my experience leads me to believe that we cannot have our day coaches kept in proper shape, especially on these long runs, without a porter to attend to them. ✓

Mr. McPherson spoke about the satisfactory reporting of space in sleepers, and claimed that in some cases we did not have sufficient operators. This is quite true, due to difficulty in securing and holding men in this new country, and there is also delay on account of wire trouble, caused at times by inclement weather.”

Mr. E. J. Coyle,—The introduction of observation cars has been recommended, but I think Mr. Bury, in his remarks, gave too much prominence to the exterior end of the observation car. This, as a matter of fact, is rather an incidental feature, the greatest feature being the interior lounging space at the rear end of the car, which gives the long distance passengers an opportunity to mix together and the advantage of the current magazine literature. I do not think there is any question in the minds of any of us who have occasion to use the American roads as to their great value, and as to the absolute necessity of the Canadian Pacific adopting them before long so that it may be in as good a position as the American lines in its competition for trans-continental traffic

Some may consider that the time has not yet come for us to make use of these cars, but the fact remains that the American lines are using them on their fast trains, and we should keep abreast of our competitors.

Chairman.—We have with us Mr. Callaway, the head of the passenger department of the Soo Line, a man who has spent all his life in passenger business, both steamship and railroading, and I am sure you will all be pleased to have a word from him.

Mr. W. R. Callaway.—I am very proud to be here to-day. The Soo Line had the first meeting of this kind in January, to discuss questions of interest, and we looked upon the record of last year very humbly, but it was owing to circumstances over which we had no control. We are going to do better this year.

The St. Paul Gateway, gentlemen, has just commenced to feed the Canadian Pacific and the day is not far distant when the traffic of the Canadian Pacific from the St. Paul Gateway will be greater than from their own line. This year the immigration business as far west as Calgary will be about three or four times the volume of last year.

There is one point that I would like to speak on, and that is the overloading of trains. I think we have started out in the proper way for the year 1906 in stating that No. 107 will not have over nine cars. Her regular equipment will be eight, in emergency cases we will put on nine. If there are more than that we will put on a second section. Last year you got a train from the Soo Line eight, twelve or thirteen cars, and there is no engine able to handle that many satisfactorily.

Now, gentlemen, I want to compliment the Canadian Pacific Western Lines on the way the business was handled. Americans are not as a rule fault-finders, but we received, with the immense volume of the Canadian Pacific business last year, fewer complaints and more commendation than in the ten years I have been in St. Paul.

Don't overload your trains, do not run a fancy schedule, do as Mr. Marpole says, make time on your trains, then you will make on your traffic.

Mr. J. Brownlee.—In talking of passenger business, it appears to me there is not enough distinction made between excursions and first class, or between colonist and first class passengers.

The matter of keeping coaches clean has been referred to. In cold places, such as between Winnipeg and Moose Jaw, there are no steam facilities for thawing out; the lavatories become frozen before they are sixty miles from the terminals and consequently have to remain in that condition until they arrive at their destination, having travelled many miles before they can be cleaned, which is very objectionable. We cannot blame the men for this, as we do not provide facilities for thawing them out.

Mr. H. E. Beasley.—Reference was made by Mr. McPherson to the failure of the Operating Department to furnish sufficient coaches at times. This is often due to insufficient advice from the Passenger Department of the number of passengers expected to take advantage of cheap rates. Of course, we have not the equipment available to justify holding extra coaches in reserve at connecting points to take care of extra passenger travel of which no advice is received.

A more comprehensive system of advice from the Passenger Agents in outlying districts should be inaugurated as the Superintendent has no means of being posted in such matters unless through the Passenger Department.

Mr. W. Cross.—We have projected a new scheme of allotment of power for passenger trains between Fort William and the Coast, but are unable to put it into effect all over the line, as on certain sections, the

engines which it is calculated are necessary to meet the demand, cannot be run either because the track or the bridges are insufficient. Now, this is a hard proposition, but the trouble is not that the engine cannot be supplied, but rather that the road or something else will not accommodate the engine which is necessary to handle the trains with satisfaction.

Mr. J. Niblock.—Mr. Cross has pointed out that on certain sections we are not able to operate the engines we need on our passenger trains to make satisfactory time. If, therefore, we cannot increase the size of the engine on these sections, we should decrease the size of the train; the one thing or the other is necessary in order to make the time.

Mr. B. S. Jenkins.—Reference has been made to service in connection with the reservation of space in sleeping cars. Some complaints in this connection reached me last year, and investigation showed that in no single instance that came to my attention was there any indication of short wire facilities or congested wire facilities. The trouble seemed to be in the porters failing to file telegrams. There were disputes between agents and porters, and it seemed to be impossible to tell who was to blame, as there was no check.

At the hotels the managers could not answer telegrams, giving the reservation as there appeared to be such a crush. We had specific cases of patrons sending paid telegrams asking for accommodation and asking for answers to their messages, but no answers could be had. These telegrams were to places in the mountains where we have hotels. I think these are the chief reasons for the dissatisfaction which existed.

Mr. H. W. Brodie.—I should like to refer to a point brought out by Mr. Beasley in which he says that the Passenger Department do not keep the Operating Department sufficiently posted with regard to the volume of business moving. We issue for every extra movement of passengers over our line, special circulars to agents, conductors and all interested, and these circulars are sent to the General Superintendents and Superintendents. The difficulty in connection with the overcrowding on regular trains seems to be that we do not have at terminals the available coach put on when, even under ordinary circumstances, there is a heavy movement of business.

Mr. R. Marpole.—I forgot to include in my paper reference to the men who water and ice cars, and that is, their usual dirty appearance, consequent, of course, on their daily occupation as shop or round house laborers. Where men have to go into cars, I would favor that they be supplied with nice, clean combination suits of blue jeans, the Company to provide duplicate suits and laundry them. The men handling ice should wear gloves and handle the ice with a small shovel. I would go further and supply in the summer the one man who goes on to the car, with a pair of tennis shoes with rubber soles, and worth about one dollar, as a man on top of a sleeping car, travelling over it with heavy shod boots, is disturbing to the occupants. The suits and shoes should be put on just before the arrival of a train and doffed as soon as it left, the Mechanical officer to look after these goods as well as the men.

Chairman.—This is, perhaps, the most important question before our notice, because it deals with the public and the handling of our passenger trains. It is, perhaps, the best criterion of the management of a railway, therefore, anything that can be done to make this system superior to any service on the American continent, it is clearly our duty to do. There is no doubt a great deal of truth in regard to the passenger service engines being overloaded. The Company should now be in a position to provide the proper power, but there are still some parts of the system where the bridges are not heavy enough.

A passenger train should not have more cars than it can haul without losing time.

Mr. O. O. Winter.—Mr. Jamieson has brought me to the point of seconding all he has said. Last year our transcontinental trains were handling as many as fourteen cars, and at the present time the limit is twelve. Twelve cars at 40 degrees below zero makes too heavy a train, and fourteen cars are too many at any season. We cannot always heat them thoroughly or satisfactorily and in the event of derailment or collision the weight is too great. I do not think there are as heavy passenger trains running on any other road on this continent as we are handling, with power of the same capacity, and if we are to make fast time, we will have to do as other lines do, i.e., reduce the tonnage limit.

Just one further comment in connection with the delays to passenger trains and smoother service. At any division or terminal point we see our passenger brakemen loading and unloading chains, dope pails, brasses and all sorts of equipment from baggage cars. Doing this, we can scarcely expect them to keep their clothing neat and clean and it is certainly unnecessary, because if the same amount of equipment were put in a locker in the baggage car, properly sealed, and a report made when opened in case of emergency delays and annoyance of this kind could be obviated. It is certainly an unpleasant thing for passengers when taking their turn on the platform on long continental journeys, to be bumped into by a brakeman dragging a wrecking chain out of a baggage car by one end, letting it drop to platform with shocking noise, and handling the tools, pail of dope, etc., in among them. This may be considered a little thing, but I assure you it causes a lot of annoyance to passengers, and I think it should be remedied at once.

Mr. A. Price.—I think it would be well for me to say a word in reply to what Mr. Winter has remarked about the handling of baggage car equipment. During the past year we have had some correspondence with Eastern Lines in which we have advocated the carrying of equipment in lockers located in the baggage cars, and I think we have good ground for saying that the trouble will probably be remedied in the near future.

Chairman.—The next paper will be on block signalling. Mr. Lee, Division Engineer of the Central Division, has perhaps had more experience than any of the officers present on the question of block signalling. It will no doubt be very interesting.

Block Signals

BY FRANK LEE

DIVISION ENGINEER CENTRAL DIVISION CANADIAN PACIFIC RAILWAY

One of the most difficult questions for the human animal to decide upon is, what will some other animal do under certain given conditions. It can readily be seen, what an enormous opportunity for speculation is opened up, when two or more persons try to decide, how some other third party will act when exposed to certain conditions.

Discussions of signalling questions must of necessity often be based solely upon that almost indeterminate quantity, "the human equation," and for this reason such discussions are often criticised as being too theoretical. Also because of this, arguments brought forward in support of some features of signalling are less likely to appeal to one, who is not familiar with the subject, than to one who has made it a study. Perhaps no doubt it is for the same reason, that we often encounter the feeling, that signalling in general and interlocking in particular is closely associated with the occult, black art, or slight of hand. None of these views however is correct, as all signalling is based upon well defined principles, and the signals themselves follow fixed physical laws prominent among which is one, that made Sir Isaac Newton famous, or at least helped to do so.

The commencement of signalling may be said to begin with the use of the locomotive; for it soon became manifest, that something would have to be devised, not only to prevent collisions between trains, but to give information to engineers regarding the position of switches and the right to go ahead. Many forms and devices were of course used in those early days, few of them being seen to-day, but which, as in the development of the locomotive, became stepping stones to things much better.

As each road or superintendent preferred their own devices to those of others, it followed as a matter of course, that the practice was very varied, so much so in some cases, that the safety signal on one road was used as the danger signal on the other. Naturally enough this state of things brought about many serious accidents, and finally resulted in a meeting being held by those interested, for the adoption of a standard form of fixed signals to be used by all roads. The choice fell upon the "semaphore," a signal which indicates by position and not by its form or color.

It is not my intention to go into the history of signalling but I am very anxious that it should be understood how important "uniformity" is not only throughout our own road, but also with any road, with which we are liable to come in contact.

The entire question of standards and uniform practice was by no means solved at the meeting referred to above, but it was the start in the right direction, and the dream of the signal engineers to-day is the adoption by all railroads on this continent of a standard, which will be uniform in whole and in part.

Some railroads have preferred to neglect the feature of uniformity of signals for reasons of economy, and although extra expenses must be borne in order to obtain such a desirable result, the great advantage in

relieving the engineer's mind and giving him much less to think about should certainly have some capital as well as operating value.

The C. P. R. has been using train order signals and to a certain extent interlocking signals, but the highest form of signalling usually comes in with block signals, which are specially designed to control the movement of heavy traffic, operated at high speed.

Block signalling, therefore, seems to present the heaviest problems; for here our old friend "the human equation" has less time to act, and his indefinability is thereby proportionately increased.

There are three general methods of operating block signals under which all the different systems of visual systems may be classified. These called the "Telegraphic," the "Controlled Manual" and are respectively the "Automatic."

With the telegraph block, the equipment of a station consists, primarily, of a signal for controlling trains, which, although preferably of the semaphore type, very often is not; of a wire used in connection with the ordinary telegraph instruments or an electric bell for conveying the information necessary to properly work the block. The telegraph instruments of a division may all be on the same wire, in which case it can only be used by one operator at a time, and every other operator can hear what is being said; or else the wire may be run from one station only to the next and thus be a local wire and ready for use at all times.

That there is an essential difference in the manner, in which those two arrangements are operated, can be seen at once, although the result desired is in the main the same in both. With the first the dispatcher is expected to keep track of the operators and see that they properly report to the stations on either side of them the arrival and departure of trains. The dispatcher may be expected in some cases to give an order for the "clearance" of each signal, thus making him entirely responsible for the blocking of trains and allowing the operators no discretion in the matter. With the second arrangement, where there is a local wire, the operator is alone responsible for the proper blocking of trains, reporting their arrival and departure to the stations on either side of him and clearing the signal only when the block is clear. There is of course with this latter arrangement the usual dispatcher's wire in each office, but it has nothing to do with the block system and is only used by the operator to notify the dispatcher of the movement of trains.

Of the two arrangements the latter is much the better plan, as the dispatcher is then relieved from the routine work of blocking trains and can therefore devote his time to the general operation of the division.

In regard to permissive blocking with a telegraph block system the method most generally adopted is to put the entire control in the hands of the dispatcher and allow the operator to give a "caution" or permissive signal, only when so authorized by him. If condition of weather and track are favorable, permissive blocking is frequently made use of for freight trains. But between passenger trains the absolute block is maintained, unless exceptionally good reasons present themselves for doing otherwise.

That a system of signals operated through the means of communication afforded by the telegraph instrument is cheap and in every way advantageous, is clearly proved from the fact of its having been so widely adopted by roads that apparently could not afford to spend money on anything not absolutely necessary. One wreck will very often pay for a good many signals and the few extra operators required to work a block system; so that, by drawing on one's imagination sufficiently as to the size of the wreck, it is very easy to figure out a great saving to any road. A system of block signals is certainly a much better arrangement, than is any practice of flagging trains; but the trainmen must be properly educated as to the extent of the protection afforded by the system and not look for it to do more than it is intended to do. That is: flagging is necessary even if the track is in the block signal district.

While undoubtedly there are dangerous situations, which may arise with the use of the telegraphic block from lack of a more complete equipment, it is certainly a great help to the dispatcher and a protection against collisions.

That engineers have run by signals when they were at danger, that operators have allowed trains to enter blocks, when they were not clear, accidents being caused thereby, has resulted in a close adherence to the rules on the part of the men and stricter discipline on that of the officers. But the fact still remains, that where a human agent is used, he is liable at times to fail, and the greater the precautions taken by mechanical means and by using two men instead of one, the less likely it is that mistakes will occur and accidents happen.

Work in this direction has resulted in the development of a system, in which the labor of two men, working in conjunction with each other, is required to clear a signal and admit a train to the block. This method is called the "Controlled Manual," which is briefly described as follows:

The station signals are operated by interlocked levers, which are electrically connected with the levers of the next station in such a way, that the signalman at one station cannot clear his signal until the signalman at the next station has released his levers, so that he can work them. There is of course a system of bell signals or otherwise between adjacent signal stations to allow the signalmen to communicate with each other.

From this it is seen that only through the efforts of two men, one at the beginning and the other at the end of the block, can a clear signal be given.

The blocking of trains by this method of operation is of course much better and safer than one, where no check is put upon the operator; so much so that many prominent men believe it to be the best system of those in use to-day. But with all this the fact remains, the personal factor is a necessary part in the operation of the plant and just so long as this is the case, mistakes will occur.

While men may have the best intentions and strive faithfully to perform their duties, error is an essential part of human action, and sooner or later the time will come, when mistakes will be made. Any system that will do away with the personal factor and at the same time give as reliable indications must certainly be in the line of progress towards that perfection and absolute security, which all systems strive to attain. The objection to an automatic signal, that because no one is on watch the signal may be disregarded, is not valid; for all, that any of the systems are designed to do, is simply to indicate the condition of the block controlled by the signal. In any case faith must be placed in the engineer, that he will obey such signals; for "A man will give all that he has for his life," and it is not likely than an engineer of sound mind will knowingly run into danger.

There are many Automatic electric signals in use all of which can be classified under two distinct heads. Those which give color indications, such as the Hall enclosed disc signal and second the regular semaphore or position signal. There is practically no difference in the manner, in which the two systems are operated, both being controlled by a current of electricity running through the rails, which is acted upon by the train. The Hall disc signal is rather cheaper than any of the automatic semaphore installations and probably is quite as reliable in its indications; this feature makes it very attractive on many roads, while other roads consider, that there are great objections to using any but the semaphore type of signal and are willing to go to extra expense in order to have a uniform style of signal throughout. Certain it is, that both of these systems are coming more into use every day. They are also giving results both in the matter of expense and the expeditious handling of trains, that other systems cannot approach.

The method pursued in the operation of an automatic electric signal

is very simple, the indication of the signal being positive: A train finding one at danger, stops; when the signal clears, it proceeds. As the blocks are generally short and trains can be run very close together, the blocking of trains is absolute, and no permissive blocking is provided for. Apparently the only rule necessary is "obey the signal," but in practice it is found, that they, like everything else about a railroad, occasionally get out of order and give a false indication, that is, they indicate danger when the block is really clear. If some provision was not made in the rules to cover such cases, it would result in the tying up of the road, until the signal was repaired. Practice on different roads varies in the rule adopted for the guidance of trainmen, when a signal is found at danger owing to the character of the country, grades, curves, etc., but the general practice is for a train to stop for two or three minutes and then proceed as under a caution signal to the next clear signal.

Signals of this type can be used very advantageously on the C. P. R. for yard limit purposes and when we compare the working of such a signal to the usual style of yard limit semaphore in use on this road, we find a great many of our present difficulties eliminated.

The advantage of the Automatic over the Manually operated signal was aptly stated by a railroad Superintendent, when he said: "The Manual block sometimes goes to sleep, sometimes gets drunk, sometimes becomes insane, and almost always lies when it gets into trouble. The Automatic is unable to do these, were it so inclined."

Mr. G. J. Bury,—In order that accidents to trains standing at stations may be averted, we submitted this year an appropriation of \$30,000.00 for the purpose of applying yard limit electric signals at stations on the Central Division where the view approaching is obscured.

I have operated divisions under two systems, the yard limit system as we have it in the west, and the semaphore system in the east, and the accidents under both were about alike. The reason for so many accidents under semaphores is that no one in particular is held responsible for attending to them. In some places it is the agent's duty and he has so many other things to attend to that he frequently neglects to operate the semaphores. At night, when the agent is not on duty, the work of operating the semaphores devolves upon the trainmen, and there is danger of an accident before they get to the lever.

On the River Division of the Milwaukee, they have the telegraph block. Since they put it into operation they have had no accidents, but as a result of it the number of trains run has been reduced considerably.

Mr. R. R. Jamieson,—Some years ago we were very much handicapped by passenger train movement into Windsor Street Station, Montreal, and to overcome the delays, the Hall Electric Automatic Signal (disc shaped, with color signal) was installed. This system worked most advantageously, and it seems to me that on Western Lines we are approaching the time when we will find it necessary to adopt some such signal system, especially for short distances. One case in point is the piece of track between Calgary and Calgary Junction, there being two branches leading off the main line from the latter station. There is a very heavy movement of freight engines and yard engines in addition to passenger trains between these points.

The Automatic signal is, no doubt, more expensive to instal but in the operation it must be economical. While I do not think we have reached the point when it would be economical to adopt the signal system in a general way on any section of the Western Division, I believe we are rapidly coming to it. The Hall system has been found efficient, and so far as my knowledge of the conditions on Western Lines goes, it would be a good system to instal for short distances.

Automatic Block & Semaphore comparison
 Review to Railroad 1906

Mr. Frank Lee,—I should like to enlarge on some points in this paper. If we have a poor signal we might better have no signal at all, and if we decide to adopt any signal, especially the automatic signal, we must thoroughly consider the cost, not only in the construction, but in the maintenance, because such a system, if it is not properly maintained, is a menace to a road rather than a benefit. The question which should be decided is whether we should adopt the color signal or the position signal. The system in use between Windsor Street Station and Montreal Junction is the disc signal, which is a color signal, and perhaps some of you have noticed that sometimes when the sun happens to be back of such a signal the position is not very clear. The position signal is more expensive to instal, but on the other hand, it is a uniform signal with that which we find on our train order signals, and our interlocking plants. I should be glad to hear some expression of opinion from the gentlemen present as to their ideas of the relative advantage of the color signal and the position signal.

Mr. A. Price,—On Western Lines the greatest density of traffic at the present time is between Fort William and Winnipeg. I understand from Mr. Lee that the Automatic block signal, which is to be installed to be used as yard protection, can be utilized as a block signal when the line is double-tracked. I do not think it would be wise to instal the signal at every station at the start, but would favor setting it up at terminal points and at what we consider very bad places for trains meeting on account of obscured view. Aside from every other consideration, we must not lose sight of the fact that the yard limit signal displayed at "stop" requires a train to be brought to a stop before passing it, and as Mr. Marpole pointed out in his paper this morning, it costs something like 48 cents to stop a train of 500 tons. There has been a lot of data submitted in reference to this item, and in the case of freight trains such as we handle, I am inclined to think the cost would amount to something like 75 cents per stop. This is something that has to be reckoned with because it is occurring every day and every hour of the day.

Mr. H. E. Beasley,—Do I understand that in the proposed block system the semaphore is to take the place of the yard limit board and prevent a stop? Is that the idea, Mr. Price?

Mr. Price,—Well, that was the point that I wished to make.

Mr. Beasley,—If a semaphore will not stop a train, why a block will not do it, that is, a signal will not do it, and so the only object we will gain by introducing the block signal will be to allow trains to go through station limits without stopping.

It seems to me it is only a matter of time before it will be necessary for us to adopt some sort of block system in order to ensure our trains keeping the requisite distance apart, especially through the canyons.

Of course, any system that is adopted should, as far as possible, be made standard.

Mr. F. F. Busteed,—I agree with what Mr. Price has said with regard to the signals being installed so that we can take advantage of them when the second track is laid.

As to the type of signal we should adopt, I have not given this matter much thought. I think, however, it is a question that will bear discussion in order that we may find out which would be the safer. I fully agree with the idea of installing signals at junction points and where the traffic is congested.

Mr. W. Cross,—While I cannot pretend to say from my experience which of the signals we should adopt, I know we have men in the room that can answer the question from the stand-point of the engineer. In

speaking some time ago to an engineer who runs a fast train on the Grand Trunk between Montreal and Belleville, he told me that at one point on the road at which the ordinary semaphore is obscured, if he is on the alert and can catch sight of that signal he has a positive assurance of safety, but if he does not happen to be on the alert at that particular moment, he passes the point at which he can see the signal, and he is right on to the danger signal before he has time to stop his train. This, I think, is the object of the position signal. However, we have men here who can tell as to whether the color or position signal would be the better.

Mr. Chairman,—You, Mr. Brownlee, having been an engineer, ought to be able to say a few words on this subject.

Mr. J. Brownlee,—Not having had any experience in the block signaling system, I should not like to express an opinion as to whether we should adopt the color or position signal. In the color, of course, there is always a chance of the engineer mistaking the color, especially if his color sense is not good. As against, this, however, in stormy weather when everything is covered with snow, the position of a signal is liable to put the engineer out.

Mr. R. Barnwell,—Some years ago on the Great Northern in England a very lamentable accident occurred through the arm on a signal at Huntington being weighted down by heavy snow, giving an "all right" signal instead of remaining displayed at "stop," and this caused the loss of a number of lives.

Mr. G. J. Bury,—It used to be on our road that if you did not see the semaphore blade it meant proceed. This has since been remedied, and the all right position is when the blade is at an angle of 60 degrees below the horizontal.

On some of the roads they are giving more attention to the targets on switches. Some of the roads have adopted a white disc to show switch set for main line, and a red arrow to indicate a switch set for a side track. I think we should adopt this system.

Mr. O. O. Winter,—If you will permit, I will say a few words in regard to the switch question. In the beginning of my railroad career, over thirty years ago, we had the white disc to indicate that a switch was set for the main line, and it proved a great relief to engineers and others to see these white discs showing up to an approaching train.

As Mr. Brownlee says, there are some good points about the color signal, particularly at night, but in the day time, if there is a severe storm it is sometimes difficult to see the color, especially if snow sticks to the signal. I presume that has also been Mr. Lee's experience with this class of signal, and no doubt it is the reason why the position signal has been considered the more effective.

Mr. R. R. Jamieson,—Before the Automatic signal was installed in the neighborhood of Montreal, this question was discussed. The prevailing system was the disc, the position signal just being introduced. It was thought that the semaphore, or position signal, might not operate satisfactorily on account of wet snow, etc., but my view now on the subject is that the semaphore or position signal is the best.

Mr. J. E. Schwitzer,—I would prefer to have the signal arm rather than depend altogether upon color. From personal experience I know that there are certain places where a man can look across a lake or plain and get a good view of the semaphore and can tell whether the line is clear or not, while he cannot state definitely as to the color of the signal, besides which anything which changes its position from that in which it is customary to find it attracts ones attention quicker than a difference in color.

Mr. J. Cardell,—I might venture to point out a case in connection with a train I was once running. We had one or two semaphores; the semaphore arm was obscured by foliage. Now to remedy this, it was suggested that we have the ordinary signal arm changed to a white one so that it would show up distinctly. The Company saw the necessity of this and changed the color, which overcame the difficulty.

Mr. O. O. Winter,—While the positive Automatic Electric block signal is the most effective in preventing accidents, and also facilitates the movement of passenger and other fast trains more than others, it is so expensive that I doubt whether it would pay our Company to adopt that system now or until such times as there is a larger increase in the number of trains run. It might, therefore, be proper to discuss some system of signals we might adopt to advantage on certain parts of the road, to eliminate the greater amount of danger and at the same time facilitate the movement of traffic. I know from personal experience that a train can be operated safely with the telegraph signal. This system possesses the feature of the permissive block, which is very advantageous on a heavy traffic single line road. No matter what system may be adopted, except, of course, the automatic block, I would not favor clearing station limits for freight trains. We see by the current periodicals that on block signal roads they do have trouble at stations, and I believe, therefore, that freight trains should be required to reduce speed in approaching all stations.

We now require freights to pass through station limits, First District, at reduced speed, and notwithstanding the heavy traffic of last fall, which I believe was equal to anything heretofore handled on the system, we did not have a single rear end collision where restriction was enforced. That seems to be a very good record when we consider that forty trains per day and better were handled over a section—heavy trains, too,—and proves the wisdom of the action. I do not believe there is any better record to be found so far as avoidance of rear end collision is concerned. The adoption of the telegraph signal would involve the expense of additional operators only, and would, therefore, be both cheap and effective.

Mr. G. J. Bury,—The idea prevails that it will not be longer than two years until the Government at Washington will compel block signals on all roads running passenger trains.

Chairman,—If there is no further discussion upon this subject, we will consider it closed. The time is soon coming when this Company will have to adopt some system of better protection to fast trains than has heretofore existed.

How to Secure the Maximum Service from Cars

By J. A. MACGREGOR

ASSISTANT SUPERINTENDENT CAR SERVICE, WESTERN LINES,
CANADIAN PACIFIC RAILWAY

The first essential is an abundant supply of power to move cars according to the demand. We have never been able to establish a reliable relationship between an engine and a car, that is, we cannot correctly figure the average number of cars that should be allotted per engine, or even per 100% of locomotive capacity, as the percentage varies according to the amount of local traffic. As a matter of information however, permit me to submit the following figures showing the number of freight cars per engine and per 100% locomotive capacity and the average mileage per car per day at two different periods of the year 1905, on each of the three grand divisions, of Western Lines.

JUNE 21st, 1905

Division	No. of Freight Cars	Engines		Cars per Engine	Cars per 100% Loco. Cap.	Aver. Miles per Car per Day
		No.	% Cap.			
Central	872	185	19985	48	45	34
Western	3232	106	11448	30	29	40
Pacific	2733	93	11967	29	23	27
Total	11967	384	43430	39	35	34

OCTOBER 21st, 1905

Central	12912	249	28386	52	46	48
Western	3653	97	11070	38	33	36
Pacific	3221	88	11704	37	27	26
Total	19816	431	51140	46	39	42

The above figures, while interesting in a general way are apt to mislead those not familiar with the methods of compilation. The Statistical Department in Montreal have not yet found it practicable to separate the mileage of the different classes of equipment, with the result that what might be a good record is frequently spoiled by including cars which do not and are not expected to make mileage. At certain seasons flat cars are stored and at other seasons box cars, but all are included in arriving at the average miles per car per day. Statements which would show the average mileage per car per day of the different classes of equipment would be of considerable value.

In the matter of transportation it is right that loaded cars should be moved promptly and in preference to empties, but empties are necessary to make loads and when the demand exceeds the supply, they should be moved with the same despatch as loads. Connections with power to meet empties are just as important as to meet loads.

There seems to be a weakness in communications between districts as to the movement of joint traffic and during the extreme pressure last year it was particularly noticeable. In order to manipulate power to obtain economically the maximum mileage from cars, an absolute knowledge of the volume of the business which will reach a district from connecting districts during the next twelve hours, is a necessity, and Chief Dispatchers cannot keep too closely in touch with each other on this question.

Form R. 6., which shows the consist of a train when it leaves a terminal should be wired to the Chief Dispatcher within a few minutes after the departure of the train. He in turn should promptly notify the connecting district, giving a brief summary of the business that will be delivered. If there is any material change in the train in transit the connecting district should be notified so that on arrival they may be able to handle it intelligently. In many instances during the rush, connecting districts were not aware of the consist of trains until they had actually pulled into their terminals, with the result that previous arrangements were disorganized. It may be claimed that terminal agents have instructions to start trains as quickly as they can get them together, but unless the Chief Dispatcher has arranged his power to meet the movement, delays will invariably occur. The effect of failure to properly advise connecting districts is more noticeable with trains arriving between 17 o'clock and 8 o'clock the following morning, the evening car report being taken at the former hour and the morning report at the latter. In handling train No. 117, power is ordered to connect long before the arrival of the train, which enables it to be handled through the average terminal with a delay of about an hour. We would secure much better service from our equipment if connections with other trains were made in the same way and this could be secured without adding one cent to the expense of operation.

In the matter of securing the maximum service from cars, the flag stations, of which we have so many on Western Lines, are difficult to control and unless closely watched delays frequently run as high as ten to fifteen days. The Chief Dispatcher should not only receive a daily check of cars at flag stations from wayfreight conductors, but should have the information compiled in a manner that would enable him to tell at a glance whether cars have been one, ten or twenty days at the same point. By an index system not entailing more than fifteen or twenty minutes work daily, of a clerk, it is possible to know just what every car is doing daily at flag stations, and I beg to submit for your consideration a draft of a form for this purpose.

While it is important to receive correct information from intermediate stations as to the number of loads and empties to be moved in each direction and the number of cars required, etc., it is equally important to be in possession of accurate facts from terminals. At small stations the situation can be sized up at a glance, but at large terminals the information must be secured from car records and those familiar with the handling of large terminals will concede the advantages of an up-to-date record. They are a necessity for the prompt locating of cars and for the proper regulation of the movement of traffic and if not strictly up to date, much time can be lost, not only to the clerical force, but to the Yard Operating Staff. Cars should be marked so that every switchman handling them will fully understand where they should be placed.

About 25% of our box car equipment is of forty thousand pounds

11720
 11720
 11720

capacity and as the majority of them were built between 1881 and 1893, they have now been in service an average of, say, 17 years. Since the addition to our rolling stock (commencing in the fall of 1901) of the 80,000 capacity car and also the improved 60,000 capacity car, delays to the smaller and older cars have been steadily increasing. Our repair tracks are filled with them, generally for heavy repairs, and as long as they remain in traffic service we must be prepared to accept a smaller average mileage than would be possible with the more modern car. At least 80% of the investigations into delays to freight develop the fact that shipments were handled in 40,000 lbs. capacity cars, necessitating delays in transit for repairs. It is true that when these cars require general repairs the draft rigging is strengthened but if we hope to accomplish results, the work of changing the draft rigging must be prosecuted with vigor at a time when the car situation will permit.

What is true of the old Fox car is equally true of the old flat car which has been and continues to be a menace to good railroading. We have in the neighborhood of 300 thirty and forty thousand pounds capacity flat cars on Western Lines not equipped with Air Brakes or Automatic couplers. These cars are figured in arriving at the average mileage, although they seldom make a run except in short haul service around terminals. Considering the lightness of structure, it is a question whether it would pay to equip these cars with Air Brakes and Automatic couplers, as in the event of being placed at the head end of heavy trains, they would not be strong enough to stand the pressure. While they were used extensively last season in stone service between the quarries on the Stonewall Branch and Winnipeg, their maintenance was an expensive item, not only for repairs but in the extra switching involved in cutting out bad order cars. Failing suggestions however, for their better use, they should be put in the best possible shape between now and April 15th, so that they may be placed in stone service.

Commencing about the first of August last year we began to accumulate box cars on the branches in the wheat belt and many of them did not turn a wheel until the 1st of October. What was the result when they were loaded? They were set out everywhere with hot boxes, not only causing extra labor and delay in handling trains, but seriously delaying outturns to farmers who were waiting for their money. In spite, however, of these delays, the average mileage per car per day during the rush, far exceeded the performance of any road on the Continent, but benefitting by experience why should we not remove every known cause that will retard the movement of cars and aim to reach the maximum?

It is needless to point out that from May 1st, until September 30th, this year, the demand for flat cars will be most acute, affording excellent opportunities for making large mileage. In former years flat cars which have been derailed in ballast pits early in the season have in many instances remained out of service until the end of the work season. Please remember that they are charged against the mileage made by other cars and that the maximum service is not obtainable without them. Might I suggest as an imperative rule, that derailed cars be cleaned up once each week and taken to terminals where the necessary repairs can be made.

The handling of O. C. S. material although somewhat improved during the past two years, still calls for improvement. It is always easier to load O. C. S. material than to unload it and our patrons are not slow in noting that cars of ties, rails, coal, stores etc., frequently stand on sidings for days while they are suffering for lack of cars. Surely we should set an example to the public in the matter of prompt unloading of cars. We cannot secure the maximum service from our equipment without the active sympathy of the Fuel, Stores, Bridge and Building, Mechanical and other Departments handling O. C. S. Material. If it does necessi-

tate an expenditure of two or three dollars extra to release a car promptly, the figure is paltry compared with the earning capacity of the car.

To illustrate how delays affect the mileage of cars, take the average mileage per car per day on Western Lines in the month of October 1905, namely, 42, or approximately 14 miles per car per hour. The effect of a delay on one car for one hour on the average would be small; on one hundred cars a delay of one hour would be noticeable but on one thousand cars it would have a considerable effect. You will readily understand from this comparison what effect a delay to 500 or 1000 cars for 12 to 24 hours would mean in the average mileage per car per day.

While we consider our car reports good when they fail to show any loads or empties to be moved held over 24 hours or cars to be unloaded held over 48 hours, it is the delays from one to twenty-three hours that reduce the average mileage, and it is by reducing these delays that we get nearer to maximum mileage. The District or Division showing half a train load of cars to be moved, held over 24 hours, on any regular section, has no license to complain of a car shortage, as more than likely the balance of the train could be made up of cars held from one to twenty-three hours, and it is such delays in movement that create car shortages. Power should wait for cars, not cars for power.

Much can be said about terminal delays and their effect on the service generally. First of all there are delays to transit cars. What would be a reasonable time for such cars to remain at a terminal? There is the inspection, breaking up of a train for local and bad order cars, adding other cars, changing vans etc. Assuming that the arrival of these cars gave a full complement of cars for the next section and that the terminal had full particulars of the consist of the train prior to the arrival, one to two hours according to the terminal and the amount of switching should be a reasonable allowance. Let us now consider the handling of cars for local delivery at terminals and its effect on securing the maximum service from cars. Our patrols are allowed 48 hours within which to unload cars and making an allowance of 12 hours for switching to delivery tracks, issuing of advice notes and collection of charges, it becomes apparent that there should be a complete change of cars every 60 hours. A fair percentage of cars, however, are released within 24 hours but allowing the maximum of 48 hours on each car with the 12 hours additional for switching etc., it will be conceded that no terminals should have on hand to unload a greater number of cars than arrived during the previous 60 hours. Please do not conclude that the terminal making such a record is accomplishing the maximum, but you may conclude that if they over-reach the limit mentioned, there is decided room for improvement. These remarks do not apply to boat points.

In concluding let me say that I have purposely kept clear of suggesting remedies, so as to leave the various points mentioned, open for discussion.

Mr. J. T. Arundel.—I wish to remark at the outset that I do not believe it is possible to get a system of statistics that will let us know what we are actually doing in the moving of cars, the movements are affected in so many ways. There is hardly a time of the year that we have not a large amount of rolling stock tied up that we cannot use. Frequently it is tied up where it cannot be used. At one time there were tied up at Fort William, I understand, for five or six weeks, 500 cars under load, and for two months 900 cars of flour and westbound merchandise and also storage freight that we had no place to put. There are also a large number of boarding cars which do not make a mile a day all summer long, shown on that report. We have a very large number on the Central Division, I suppose they have them on other divisions too.

With regard to the cars not making mileage, one trouble is accidents, and accidents which tie the cars up for a number of hours tie up, not only the cars on the trains affected, but also prevent other cars from moving in either direction. An engine failure also ties up dozens of cars for a number of hours and affects other cars that we may be hauling. Hot boxes were also one of the most serious handicaps we had about the middle of October. The trouble should, I think, be located here to-day. I have no doubt the Mechanical Officers could tell us what it was. There is one thing I want to remark and that is, we loaded last year in excess of any year on the Central Division—I do not know if that had anything to do with it or not. I know that we are troubled in a great many cases with insufficient packing, in many cases we had brasses that were worn out.

One of the troubles we have to keep cars moving is shortage of power; we always have had that. This, I think I will leave for some of the others present to speak on.

Mr. W. O. Miller.—There is one thing I notice has not been touched upon, that is bad order cars. It seems to me it would be better to repair a car and have it ready to go into service when not required than to go out of service and under repairs when required. Whenever it is necessary to reduce expenses from time to time I suppose the Car Department is the first one to receive attention, both in the passenger and freight equipment. Another point is in connection with unloading our O. C. S. traffic. The delays are very bad and it seems to me that we should devise some scheme so that we could reduce them to a much lower point.

Mr. J. Niblock.—On the Western Division one of the greatest delays we have is on cars awaiting repairs on account of material. It was no uncommon occurrence during last fall for us to have from fifty to one hundred cars standing for from a week to two weeks until the necessary articles for repairs could be got from Winnipeg. Mr. Cardell will bear me out in this when I say it is a very large item for detention. These cars, you understand, came from the Central Division, and the Pacific Division would not take a car unless it was in perfect condition, but the Central Division has full permission to send us all their bad order cars.

Mr. H. E. Beasley.—Regarding the remarks made by Mr. Miller on the O. C. S. freight. Considerable difficulty is experienced, but it is chiefly due to the fact that the superintendent has not got a car clerk. The car clerk on my district is responsible to the Car Service Agent. He is able to follow up and clean up a case but on outlying districts, I think there is not sufficient staff to watch that part of the business, as it should be one man's duty on each Division.

Mr. W. O. Miller's remarks in regard to bad order cars is one of the frequent causes of delay, but immediately the limit of bad orders has been reached or run over, we get after the Mechanical Department to put extra men on which assists a great deal. I do not think any of these difficulties are such that they cannot be eliminated. It simply requires prompt action.

Regarding hot boxes. There was an epidemic of hot boxes last month, not very serious, but I found it was on account of cars not receiving sufficient oil and it is quite possible oiling stations are too far apart. Perhaps the Mechanical Department can explain the reason for hot boxes. Our trouble was chiefly caused by cars not having reached an oiling station.

Mr. J. S. Lawrence.—As the Kootenay Section is probably responsible for the low mileage on the Pacific Division, I feel that it is my duty to explain to a certain extent, but before doing so would like to say with regard to the O. C. S. freight—I have found it a very good practice

to have the agent advise me after the cars have been on hand three days. He first advises the head of the Departments to whom the cars are consigned and then if the cars are not released within three days, my office is advised. At first I used to receive quite a number of advices but latterly the heads of the departments think it is advisable to get them unloaded without waiting after the advice is received, and I think by watching them closely it no doubt reduces the number of O. C. S. loads.

Then again in the Kootenay District, we have five smelters, and they are receiving a large quantity of coke and coal, and for some reason think they have a right to hold cars for storage. In one instance I might mention one smelter had under load 107 cars of coke, and it seems impossible to get them to release these cars promptly. For some reason the Traffic Dept. do not think it advisable to insist on car rental on account of causing some feeling, but it reached such an extent a year ago that I got in correspondence with Mr. Mendenhall, Chairman of the Butte Terminal Association (and at that point as we all know there are a large number of smelters) and they got up certain rules allowing the smelters a certain time to unload certain classes of freight, and Mr. Mendenhall stated that when they were first put into effect they caused a great deal of trouble, but they adopted the practice. One of the rules stated that unless settlements were made for car rentals and all freight charges that no switching should be done for that smelter until a settlement was made as rendered by the agent, and if there was any question as to proper charge that it should be adjusted by the Traffic Dept. later. After one or two cases of that kind where they refused to do switching he stated that there was no further trouble. Of course there is strong competition in the Kootenay and it is a question whether the Great Northern would join in such an arrangement as this, but as they are members of the Butte Terminal Association, it appears to me that it should be possible to get them to join us, and if so it would assist us in securing better mileage from our equipment.

Mr. F. W. Peters.—During the discussion so far the first remark that has been made in which the Freight Department are drawn into this discussion has been made by Mr. Lawrence and I am glad he did so, because it gives me an opportunity of perhaps defending our Department against an impression that I think prevails, that we are opposed to the imposition or enforcement of car rental rules when freight cars are detained by shippers or consignees. Now, that is entirely a mistake, because when cars are detained the Traffic Department suffer. There is a limit to the equipment at the disposal of any company, and if that equipment is delayed in handling we suffer by detention to traffic. Mr. Lawrence has spoken of the condition that prevails in the Kootenay, which is perfectly correct: until quite recently neither of the companies operating in that territory have been in a position to agree to enforce strictly the Car Rental rules. The traffic of those smelters was strongly competitive, and we realized that before we could properly enforce car rental charges, or agree that they should be enforced in accordance with the Railway Act, we should require the approval of the Railway Commission to car rental rules before same could be enforced. On the 11th of January the Railway Commission approved of Car Rental Rules for Canada. Those rules can now be fully enforced, and we hope we will have the co-operation of the Great Northern Railway in the enforcement of the same, and we believe that that can only be done under the authority of an Association of which the different roads are members, and so long as the Freight Department know those rules will be enforced by all roads uniformly, we certainly will never object to their strict enforcement and the collection of car rental for all equipment delayed, as there is no reason in the world why a smelter should get in a number of cars on which the lowest rates are charged and hold them as warehouses on wheels.

The revenue on most of the traffic handled by smelters is the lowest per ton per mile of any freight we handle, possibly with the exception of grain, and it is an imposition on the railways that their cars should be tied up as they have been in the past to the injury not only of the Railways but of other shippers.

Mr. J. Brownlee,—In connection with delay to the movement of cars, I found on my District that the delay at flag stations is responsible for most of the detentions on the district. It is nearly impossible to get farmers, particularly if the cars are supplied at grain loading platforms, to load the cars in the time allowed, and it is almost impossible to get the merchants to unload the cars that are spotted at these points for them on account of our not having agents to insist upon it being done and enforce demurrage charges. That was overcome to a certain extent on my district last fall by putting the matter in the hands of Roadmasters, B. & B. Masters, Trainmasters and myself, and when we were travelling to check up the yards at flag stations, and find out how long the cars had been there. In that way we were able to keep the cars moving fairly well. But I do not think that is the best system. Now, I would suggest that there be a man appointed on each Superintendent's district where the movement of cars is very heavy and where there is a large number of flag stations to look after this business and at the same time check up the stations where there are agents. I do not believe in appointing a man for three or four districts because I believe in every man being responsible for a certain district. Now, whether that can be arranged by an extra trainmaster or a Car Service Agent or something of that kind, I would not like to say, but to me it appears that our mileage is so great that the officers should not be expected to do it. For instance, I suppose it is safe to say that on the Central Division we have two hundred men for each trainmaster to look after. I do not think that there is any big corporation that expects one foreman to be successful with a gang of men of two hundred in number. There is as Mr. Arundel pointed out, a great deal of delay on account of hot boxes, but I cannot agree with him that there was not a great deal of it originated last fall through the storing of cars at flag stations and other stations by the elevator men and others taking the packing out of the boxes to light the fires in their elevators, and that the cars are usually stored on the elevator track and a great deal of grit and dirt comes from the elevators and goes into the boxes. Then, as Mr. Lawrence pointed out, the cars do not get to oiling stations enough. Previous to Mr. Eaton coming West our cars ran from Winnipeg out west to the mines and back again without being oiled. As a consequence, some of our cars started from Winnipeg to the mines, were loaded and unloaded at some intermediate point and sent back to the mines and kept there all summer, not getting any oil until they reached an oiling station. Now a great deal of the delay is due to that cause. We cannot expect to make time with our fast freight trains if we ask men to pack boxes along the route. There is also another cause of serious delay in connection with the 40,000 lbs. cars. I think everyone will admit that the greatest amount of repairs is generally on that class of cars and I think you will also admit that repairs to other cars is also due to these cars being in the train. If a 40,000 lb. car is on the train and the draw bar is pulled out, the air goes into emergency and it damages all the rolling stock in the train which otherwise would be all right. I think the sooner this Company decides to take the 40,000 lb. cars out of service, the sooner they will reduce expenses and the more satisfaction we will have in moving the traffic and the less delay there will be to cars. I think in the new country where we are opening up new stations, the bodies of the cars could be taken off the trucks and used as portable depots.

Mr. Chairman,—I think I would like to hear from Mr. Eaton on the

question of delay to repairing of cars. I have just had a memo. placed before me showing that during the months of September, October and November thirty five per cent. of the cars passing through Winnipeg were held for repairs. This is a very extraordinary statement, that more than one-third of the cars passing through Winnipeg were held for repairs. I agree with Mr. Brownlee as to what he says about these light cars, that they are a source of danger in the train.

Mr. G. H. Eaton,—I have not had the experience in this part of the country that I would like to have had to enable me to speak on this question. The matter of that thirty-five per cent. is a fact. I kept the record myself and ninety per cent. of the number were 20 ton cars. That is one reason why there were so many. Another reason was that the cars were allowed to go into that condition before the busy season started. I was handicapped considerably by shortage of men and had to hire Italians and all sorts of foreigners and educate them to this work. The cars would come in on the repair track and probably want a new brake beam. The brake beam would be supplied. We had no time to do any further work to the car. The result was that by doing so the car would go out and when it got to the next terminal it was on the repair track again. Now, the only practical way I know of to overcome the difficulty is to do the work in the early season. We would avoid so much shop work on cars, and I think by having the cars shopped in the slack season and thoroughly repaired then, expense would be saved in the way of shunting and detention to trains.

As regards the hot box question, Mr. Brownlee covered it very well. The cars are left in the sidings just when we change from the summer to the winter oil and I think if the Car Department would start out from different points, say the last week in August, certain men with winter oil, to go to the different places where the cars are stored and put a little more oil in, that it would certainly avoid a lot of detention to trains.

This is about all I can say on the subject at present.

Mr. J. J. Scully,—The previous speaker seemed to indicate that the Car Department would have to shoulder the responsibility of small mileage, that is, with the exception of the Traffic Department. I think the small mileage is chiefly due to shortage of power. When we have ample power and we are short of cars our attention is turned to every individual car on the District and very frequently the General Superintendent finds the number of these isolated cars that are waiting repairs and very shortly additional forces of men are put on and they are cleaned up. If we could have sufficient power at all times that same attention would be given to repairing cars. If I will be forgiven by the Mechanical Department Officers for what I am going to say, I will say it. Every fall at the close of the navigation season we all look for the date the reduction is about to take place in the Mechanical and Car Departments and then we have to put up with anything until the new wheat comes along. Of course I do not wish to say anything about the policy of the Company, but merely to give you my opinion. All winter long, this Company could as well maintain a large number of men working in the shops as during the summer and the fall wheat rush. If they would employ these men it would only take one year to place in good condition all the engines waiting repairs. In all shops men will work to advantage in the winter but not so in the Car Department, as at most of the large yards where cars are repaired it has to be done out doors, and if I may say it, it is money thrown away, a man cannot do half a day's work with the weather forty degrees below zero.

With reference to the hot box question. On our branch lines considerable of it was due to the elevator men, but we had considerable on the main line, and I think it was due to the quality of the packing. I

have noticed a great deal of packing and it is a little too dry because I think it was made without care. It was very good for the first year that we had it but lately it is no use. I am under the impression that a lot of packing is made of summer oil and you can very often see a hot box with the forward end of it blazing and the back end of it will remain frozen.

As you have agreed to do away with 40,000 lb. cars on Mr. Brownlee's suggestion I will not dwell on them, but I think some consideration should be given to the suggestion that if we could only have a full staff working for one year all winter the expense could be reduced by about thirty per cent. per annum.

Mr. R. R. Jamieson,—Just one word before leaving this discussion. I would like to say that so far as my experience goes, repairs to engines and cars are not carried on as they should be. We want all our engines and cars when the traffic is heaviest, as we are not then prepared to lose any time in order to effect repairs, other than are absolutely necessary from break-downs—we should prepare equipment when the traffic is not so heavy. I do not think that on any section of the line, when the rush is over, we should cut such repairs down to the then actual requirements. I can only repeat that on one occasion only in the last four years have I had a sufficiency of engines or cars, and but for a short time. It seems to me therefore that there should be no letup during short periods of slackness on repairs to both engines and cars. The growing time is now hard upon us, and we should not only take care of the present but anticipate and prepare for even greater growth in the future.

Mr. T. Kilpatrick,—Regarding the movement of cars and the time of O. C. S. loads. As has been stated it is often caused by men not being available to unload, but in many cases we have found here, and more particularly during the past year, that it was impossible to get power to move the cars. It took all available power to keep ordinary traffic moving and O. C. S. loads had to set in side tracks and thus caused a loss to the different departments doing work through lack of material.

With regard to the hot box proposition, we do not have any very serious delays, but with regard to repairs, there have been a great many delays and I think this is due to the insufficient car repairers and want of necessary material.

Mr. F. W. Peters,—It is contrary to the rules to speak twice on the one subject, but if you will permit me to say a few words, I would like to speak in reference to the doing away with 40,000 lb. cars. The trade conditions at present seem to make it inadvisable to do away with these cars entirely—I refer to the movement of eastbound all rail traffic, particularly flour. The millers of Manitoba are in competition throughout Ontario and Quebec with the millers of Western Ontario who get their grain down by the lakes, and owing to the large percentage of small cars still in use on Eastern lines, they have the advantage of a 36,000 lb. minimum. The average dealer of flour through Ontario and Quebec would certainly not order 56,000 lbs. which is our minimum on our standard car, when they can buy from Western Ontario millers 36,000 lb., therefore our Western millers say to us "Unless you can put us in a position to compete with the millers of Ontario who grind Manitoba wheat, we are out of business", and I do not see any way of getting over the difficulty until the smaller cars on Eastern Lines are abolished and we all have standard cars of 60,000 lbs. We thought we might be able to establish a storage shed at North Bay and later one at Sudbury to induce the Western miller to load our large cars to their capacity at these points, and then redistribute from there in the smaller cars, but this plan is opposed by the larger millers. We have, however, in the past two years done away with the 40,000 lb.

cars to the Pacific Coast as far as possible. If it becomes necessary we use a 60,000 lb. car with a 40,000 lb. load, and protect that minimum, but it is a pretty serious thing to load a 60,000 lb. car and haul it to Ontario or the Eastern Provinces when that car is to be returned empty. However, I believe if we could confine the use of smaller cars to the Manitoba millers for such eastbound shipments as described, a large number of these could be eliminated, and they could be kept in that territory, and not be allowed to drift to the west.

Mr. J. T. Arundel,—It might be possible for the millers, especially the larger ones, to ship to Fort William in the 60,000 lb. cars and reship in the 40,000 lb. cars to keep the latter cars east of Fort William.

Mr. W. Cross,—The general impression that might be gained by the meeting would be that this Company has done nothing towards getting rid of the 40,000 lb. cars. A long time ago it was recommended that these light cars should not be repaired beyond a certain expense. That was a great step towards the abolition of the 40,000 lb. car. We have gone along, therefore, making great progress. We have made great progress in Winnipeg this year in this connection; we put over 100 out of existence. Mr. Peters has just demonstrated that we cannot go recklessly into this thing for the sake of the Company's business, and apparently from a capital point of view we cannot. Take the boarding cars between Laggan and Fort William. I suppose this question alone runs into thousands of cars. Now, this is an enormous thing.

With regard to the running of fast trains on time. Now, if you have not got a level road bed you are going to have hot boxes. There are all kinds of conditions which affect trains, but the first thing is the hot box.

Mr. W. O. Miller,—Just one word in connection with the remarks made by Mr. Cross about the repairs of cars. Especially in the Kootenay District the Western Division is pressing us to return the cars to balance the interchange at Kootenay Landing, and if the repairs at Nelson were kept down to what they ought to be, we could probably keep the interchange balanced and also meet the demands of traffic instead of necessitating cars to be hauled from the East to replace those we are unable to return to Kootenay Landing owing to repairs not being effected. Therefore, it would appear that the repairs could be made cheaper than to haul the necessary cars from the East to meet demands.

Mr. J. J. Scully,—Allow me to say a second word in regard to Mr. Cross' remarks about hot boxes, that they are caused by a bad track. Last fall was the only time that we had any trouble with hot boxes, and it was the time that our track was best, just having completed our work on branch lines as well as the main line, and the sudden appearance of hot boxes at a time when all cars were in movement shows that it is something else besides bad track.

And with regard to the serious handicap of waiting for grain doors, etc., from Winnipeg, they load a car with stores, and it will contain a lot for every division and terminal point from Winnipeg to Calgary. The car has to be set off at six terminals. Now, I consider the divisional points, Winnipeg to Calgary, could all stand a car load of supplies a month.

Freight Claims and How They May Be Reduced

BY W. H. D'ARCY

GENERAL CLAIMS AGENT CANADIAN PACIFIC RAILWAY

Mr. Chairman and Gentlemen, it is my privilege to speak to you on the subject of Freight Claims and how they may be reduced. A good deal of embarrassment attaches to the discussion of such a subject on an occasion like this, for the reason that it is so comprehensive, that to properly consider it in all its phases, would consume very much more time than can conveniently be given to it. I shall therefore be glad if you will make a note of such questions as may occur to you in connection with the suggestions advanced, or with any other matter having a bearing on the subject, which may seem to you to have been omitted, for I am not vain enough to suppose that I can cover the ground fully, any more than I can contribute anything novel or valuable to the discussion which has not been heard before from others.

The subject of the Loss and Damage Account is at present considered one of great and pressing importance by the large Transportation Companies, and is not infrequently made the subject of very warm importance to the Claims Departments.

The phases of the matter as they appear to me are:—

- (1). The pecuniary result to the Company, which is a phase sufficiently serious in itself to attract our attention.
- (2). The disappointment and embarrassment to the patrons of the Road, whenever their goods are either lost, damaged or delayed while in the possession of the Company.
- (3). The vexatious delay which sometimes occurs in connection with the investigation and adjustment of valid claims, which at places of competitive attention, results in strained and unhappy relations between the Company and its customers, and a consequent loss of revenue.

A fourth phase of the matter is the difficulty some of us have in distinguishing between the injustice which the claimant, on the one hand, feels when a claim is refused, and the injustice to the Company on the other hand, where, although not liable, they are obliged as a matter of expediency, to make some settlement.

I am glad to be able to say that the number of Claims for loss and damage which we have to deal with, compares most favorably with the state of things on other Roads, having regard to the mileage and the volume of business handled. Let me give you the figures showing the average number of such Claims received daily from the Central and Western Divisions for the years 1902 to 1905. During 1902 the number was eighteen, 1903 twenty-eight; the great increase in 1903 was brought

about by the Freight Handler's strike. Although there was a very large increase in business in 1904, the daily number of new claims received was only 27, and notwithstanding the fact that the business continued to increase phenomenally, the average daily number of new Freight Claims in 1905 was only 27.3, thus demonstrating that a large increase in business does not necessarily mean a proportionate increase of claims, an explanation which is too frequently given when an increase in the number of claims attracts attention.

The figures for the same period for the Pacific Division are, for 1902 four, 1903 eight; you see that the Freight Handler's strike affected the Pacific Division in the same way as it did the Central and Western Divisions. During 1904 that average daily number of new claims was seven, and in 1905 nine. The Pacific Division therefore, received two more new claims daily during 1905 than during 1904.

The total number of Loss and Damage Claims for the Western Lines during the year 1905 was 11,097.

Now, let us see whether we are going from bad to worse or from good to better in this matter. Last summer I made inquiries regarding the number of Loss and Damage Claims handled by a Road whose mileage and business would form the fairest comparison with that of the Western Lines, and was informed that they received 1600 new claims per month, or 19,200 for the year, 8,103 more than arose with us last year.

It is interesting to observe that another road whose position is somewhat similar to that of the Western Lines, handled about the same number of claims of this nature last year, their figures being 19,877. So you see that we are holding our ground well and not allowing the Loss and Damage Account to increase commensurately with the grand increase in the volume of our business.

A third road to the south of us with only a mileage of 1,829 miles, received 8,906 Loss and Damage Claims last year as compared with only 8,559 for the Central and Western Divisions with a mileage of 4,392 miles.

This very favorable comparison is in a measure due to the business being peculiarly within ourselves, which I mean that when goods get astray, we know that they are in our own territory somewhere, and that it is only a matter of searching diligently and intelligently in order to find them. But in view of these favorable conditions it appears to me that a large percentage of the claims that arise are avoidable, and the purpose of this Convention among other important matters, is to see how our methods can be improved, so as to bring the amount of the Loss and Damage Account down as nearly as possible to that which should be allowed for what is incidental to and inseparable from the handling and carriage of freight by all Transportation Companies.

Let me now state briefly our position with regards to the number of claims of this nature which we have in hand at present. As I have stated, we received 8,559 claims during the year 1905 from the Central and Western Divisions, and the number we had in hand on the 31st of December 1905 was 1747; 745 of these were received during the month of December, 423 during the preceding month, and 236 during October; so here we had a total of 1404 claims in hand at the end of last year, which were all the way from a few days to three months old, leaving a balance of 343 of older dates. In the case of the Pacific Division, we received 2,538 Loss and Damage Claims during 1905, and although this was 634 more than in 1904, and we had 775 in hand about the beginning of last year, yet all we had outstanding at the end of 1905 was 488, or a total outstanding for the Western Lines of 2,252 claims out of 11,097 claims received during the year, and please bear in mind that the working number of 2,252 included claims sent to us by Foreign Lines for our record and also declined claims that were revived.

I think these figures will suffice to show that the state of things in the Claims Department of the Western Lines is quite satisfactory, to say the

least. But we could do better if we were allowed to settle all valid claims arising on our own business, without being required to investigate the cases so fully. At present we are placed in a position to settle all claims not exceeding \$50, on receipt of the necessary documents and reports establishing the Company's liability, and the claims situation has been greatly improved by reason of this. The Freight Claim Association, recognizing the desirability of prompt settlements has also adopted a rule, under which its members are authorised, to settle all claims for *concealed* damage not exceeding \$20 arising on through business, without regard to the record en route, and these claims are afterwards pro-rated from point of shipment to destination. This is another step in the right direction.

Doubtless some of you gentlemen are unable to understand why it should take two or three months to investigate and settle these claims, and I shall explain how it comes that it is sometimes impracticable to do better. Firms in Winnipeg have currants shipped to them from points on the Mediterranean; something happens during the ocean carriage to New York, and the goods arrive in Winnipeg short or in a damaged condition. A claim is made by the consignees and is sent by us to the Railway Company who received the goods at New York; we are told that the loss is an insurable one, and that the claimant's recourse is to the Underwriters. The claimants take the matter up and are informed that their policy does not contemplate the settlement of claims in such cases, that the insurance does not cover partial loss, but only total loss in the case of the ship going down, and while all this correspondence is going on, the Claims Agent is ducking his head out of the way of knocks from the claimants, who are unable to see why the claim should not have been paid by the delivering line within a few weeks.

Teas are shipped from the Orient to Winnipeg, and loss or damage occurs with the initial carrier on the way to Hong Kong, where we receive the consignments and protect ourselves by qualifying the receipts which we give to the preceding carriers. The goods are landed in Winnipeg and a claim is handed in to us. It is not customary to investigate such matters by cable or wireless telegraphy, so we send the papers to Hong Kong by mail, and it takes a month for them to reach there and be returned; the information obtained is not satisfactory to the claimant and we have to duck our heads again.

Iron is shipped from Sweden and is damaged on the way to London, where it comes into the possession of this Company and the claimant expects us to pay for the damage, but of course we can only endeavour to make recovery for him, the liability not being ours.

Again, a shipment is made from a point on this Company's line to a distant point in the United States; the goods are handed over to the next succeeding carrier intact and in good order, something happens afterwards and the consignees charge back the loss to the shippers who ask us to pay for it. We send the claim to the Carrier with whom the loss or damage occurred and that Carrier takes his own time to deal with it and may disclaim liability. We cannot, of course, pay the claim, as the loss did not take place with us and we are absolved from liability under our Bill of Lading from loss arising beyond the limits of our own line; but as we are the most accessible parties in the matter, the shippers still look to us and hold us responsible.

I could give other instances to show how it comes that claims of this nature are outstanding for months, and I really cannot see how we can avoid having more or less of such delay and trouble.

The importance of investigating claims carefully and adjusting them promptly, cannot be over-emphasized, promptness, as you know being half the value of anything which has to be done, and thoroughness being absolutely necessary to correct conclusions. I wish, therefore, to say here, that the work cannot be done by the Claims Department without the

co-operation of the other departments. Inexcusable delay to correspondence is too frequently traceable not only to our Agents, but also to our Officers, and the matter should engage our attention and be corrected.

I find that about twenty per cent of the Freight Claims presented are declined, which means that we declined 2,218 claims last year. We can justify the refusal to pay claims, by showing that the loss, damage, or delay was brought about by something beyond the control of man. It appears that we are also excused where the loss or damage arises from a defect or weakness in the thing carried, the insufficiency of the packages, leaky or defective casks, decay of perishable articles without the fault of the Company, or where the goods are poorly packed and many other things. In the case of Live Stock, horses, cattle and other animals, like human beings, are subject to the thousand natural ills that flesh is heir to, and therefore, the Company, where there has been no negligence on their part are excused if animals perish from sickness. Or if a horse slip, fall, kick or plunge, or in some way hurt itself during carriage, the Company are not liable. But unhappily, the public conscience is not educated up to a point where it regards the settlement of such claims as involving any moral turpitude. Most business men, I venture to say, upright as they are in their business life, are not impressed with the notion that it is an offence against good morals to get all they can from the Railway Company by pressing for the settlement of claims for which the Company are not justly and fairly responsible. Indeed, there is a common public sentiment, that no matter what the circumstances or the nature of the contract may be, the Company ought to come to the rescue of the shippers. This sentiment arises in a measure from the facts that the evidence of the Company's non-accountability is within themselves, and that the shippers are not in a position to verify or dispute the correctness of what we tell them without having recourse to the courts, and few business men, for some reason or another, are sufficiently philanthropic to go to law for what may be, not only for their own advantage, but indirectly for the advantage of others.

The most unsatisfactory class of Freight Claims are those for which neither the shipper nor the Company seem to be responsible. A concrete case of this nature is furnished by the late fire at Moose Jaw station, when a large quantity of goods destined for other points, was being held by the Customs awaiting clearance from Bond by the owners, and a number of other consignments for Moose Jaw, which had only been in the warehouse a short time when they were destroyed by fire.

The Company only insure against loss of this nature where it is shown to have arisen from negligence on their part, and as the investigation of the matter did not disclose any evidence of negligence on the part of the Company or its employees, payment of the claims for these goods was refused. Now, you cannot reconcile a shipper or a consignee to the propriety of the position which the Company are obliged to take in cases like this, and these are the kind of claims which make the lot of the Claims Agent a very unhappy one, and place the Company in a wrong light with the public.

Consignees should be advised promptly of the arrival of their goods, and where they find it convenient to leave them on hand at a railway station, they ought to keep them insured themselves; at the same time it hampers us when goods are allowed to accumulate at our stations, instead of being taken delivery of promptly, and we therefore, do not encourage this practice.

As an alternative suggested for a way out of this difficulty, the Company might expunge or ignore the excepted risk in their Bill of Lading relating to loss by fire without negligence on their part, and keep the goods insured against such loss, whether it occurs through negligence or not, and not only while the goods are in the possession of the Company as Carriers but as Warehousemen, during whatever time may be considered reasonable within which the consignee should take delivery, or else accept

the risk themselves for loss occurring beyond that time.

As to the prevention of claims, it is necessary for me to be somewhat prolix in the enumeration of the cautionary facts in connection with the receipt, handling, carriage and delivery of freight, in order to make the discussion which they doubtless will provoke, of some practical value.

I have classified them under three headings:—

- (1). Those which should be observed at shipping points.
- (2). Those which are of importance during the carriage of the goods.
- (3). Those which should be kept in mind at places of destination.

SHIPPING BILLS, SHIPPING RECEIPTS AND LIVE STOCK CONTRACT.

All goods tendered to the Company for shipment, should be accompanied by Shipping Bills and Shipping Receipts should be given in exchange for same on the Company's Bill of Lading Form.

Here is a very important matter; we all know that the liability of a Railway Company arises from the fact that as Common Carriers, they are practically insurers of the goods while in transit. This liability is absolute, but it may be qualified by notices or conditions. These Notices or Conditions of Carriage limiting the carrier's liability are almost all invariably inserted on the Bill of Lading, which is not only a receipt evidencing the delivery to the Company of the goods specified in it and the place of destination, but also constitutes a contract between the shipper and the Company containing the terms and conditions upon which they mutually agree that the goods shall be carried. The contract is usually made out in two parts, one called the Consignment Note or Shipping Bill, being in the form of a request to the Company to receive and carry the goods specified to a certain destination upon the terms and conditions expressed upon its face and back; this Shipping Bill is signed by the Shipper or his Agent as the case may be. The other part of the Contract is the receipt whereby the Company acknowledges to have received the goods and agrees to carry them to their destination upon the same terms and conditions.

It will, therefore, be seen how important it is that a Bill of Lading should be executed in all cases where goods are delivered to the Company for shipment, and the same thing applies to the Live Stock Special Contract in connection with the shipment of Live Stock. The system does away with all questions which formerly arose as to proof of knowledge of conditions on the part of the shipper.

Furthermore, the production of the Bill of Lading greatly facilitates matters for the Claims Department and expedites the settlement of claims, for where it is not producible the Company must satisfy themselves as to the receipt of the goods, and their condition when received for shipment before the claims can be entertained, and this means delay.

RELEASES.

In the case of goods in connection with the shipment of which a Release is required to be signed by the shipper limiting the Company's liability to a specific amount in the event of the goods being lost or damaged during transit, care should be taken to see that the Release is not only signed by the shipper or his Agent, but that they clearly understand the nature of what they are agreeing and subscribing to, and where shippers can neither read nor write, the Release should be read to them and the execution of it properly witnessed. The Company have had to pay large amounts in cases of this nature, where it turned out that the Releases were not properly obtained, and also where they were signed by employees of the Company in order to oblige the shippers who were in a hurry and had not time to attend to the matter themselves.

NOTATIONS ON SHIPPING RECEIPTS.

Notations of shortages and damage, after the goods have been carefully checked, tallied and examined, should not be made on Shipping Receipts in common lead pencil.

NOTING ON SHIPPING BILLS AND SHIPPING RECEIPTS THE ACTUAL DATE OF RECEIPT OF GOODS.

Care should be taken to note on Shipping Bills and Shipping Receipts which are often prepared by shippers themselves, the date the goods are actually received by the Company. It is often the case that the Shipping Bills are of old date, and that this is not noticed by the checkers, and it is particularly important in the case of goods received by conductors at Flag Stations. If the Shipping Bill is of old date, and the date of the delivery of the goods to the Company is not inserted by the Conductor, and the goods which may be of a perishable nature, are reported damaged on arrival at their destination, there is nothing to show that the Company did not receive the goods on the old date of the Bill of Lading, and therefore, the consignee, not knowing the facts, attributes the damage to the seeming delay in transit, and makes a claim which must be investigated in order to ascertain the facts and satisfy the Claimant that his Bill of Lading was dated long before the goods were delivered to the Company for shipment.

PROPER AND SUFFICIENT MARKING GOODS.

All goods tendered for shipment should be properly and sufficiently marked and addressed.

The marks, numbers and addresses of all goods should correspond with those shown on the Bill of Lading.

Let me here give you an instance of what occurred a short time ago as the result of a discrepancy of this nature;—A consignment of household goods was shipped from Lethbridge to one A. Anderson of Fort Steele; the car in which the goods were loaded at Lethbridge was opened at Fort Steele Junction and the check there showed a shortage of one box, which was duly reported by the Agent. A claim of \$250.00 was made by the owner; of course we were looking for a box addressed to A. Anderson, Fort Steele; we failed to find such a box, but at last we came across a package in the Freight Shed at Lethbridge addressed "Sherlock & Co., Lethbridge" which was found at Nelson in the car from which the Anderson package was short and returned to Lethbridge as addressed.

To make a long story short, the shipper procured the empty case from Sherlock & Co., and neglected to erase that firm's name and address which were stencilled on it, and if he ever put a tag on the case bearing his own address, it was either overlooked at Fort Steele Junction or fell off.

The practice of shippers merely showing the initials of their names and places of destination on their goods should be corrected. There has, however, of late years been a great improvement in the manner of marking goods, but we still come across cases of poor and insufficient marking. The letters O.L. stand for Oak Lake and Onion Lake, the letter "B" which may be intended for Beausejour is also the initial letter of Brandon and Boissevain, "C" is the initial letter of Carberry, Calgary Cranbrook and so on.

DISCOURAGE SHIPMENT OF PERISHABLE GOODS WHEN UNABLE TO FORWARD PROMPTLY.

Where perishable goods are tendered to the Company for shipment and it is not practicable to send them forward promptly, and the Company have no facilities for protecting them, the Shipper should be requested to hold them until the Company are in a position to send them forward without delay. There is no good reason why the Company should take the risk of perishable goods spoiling on their hands in such cases; but

where the shipper insists upon delivering the goods, a notation should be made on the Shipping Receipt that the goods are accepted by the Company at the owner's risk of unavoidable delay in forwarding the goods.

We have had to pay claims amounting to hundreds of dollars for consignments of green hides which were accepted by our Agents at country places and held sufficiently long to constitute unreasonable delay, for want of suitable cars to load them in, and in the meantime they became a total loss. Agents should not accept such consignments for carriage unless they are in a position to forward the goods within a reasonable time.

Agents should be on the lookout for such shipments during the spring of the year as the hides are kept frozen by the owners during the winter and when there is a period of warm weather in the spring, they thaw out and go bad, and unless we can show that their condition was not the result of unreasonable delay in transit, the shippers hold us responsible.

**NOTE ON SHIPPING BILLS AND RECEIPTS WHEN GOODS ARE RECEIVED
INSUFFICIENTLY PROTECTED, AND DRAW SHIPPER'S
ATTENTION TO THE RISK HE IS TAKING.**

When goods are tendered to the Company for shipment which are not sufficiently protected, the attention of the shipper should be called to the risk he is taking in shipping his goods in that way, and a notation covering each case should be made on the Shipping Receipt as well as on the Shipping Bill, so that the Company may have knowledge of this in the event of a claim being made for loss or damage by reason of the insufficient protection. A similar notation should be made where goods are tendered for shipment in an unfit condition to stand transportation with reasonable care.

NOTE CONDITION OF GOODS WHEN TENDERED FOR SHIPMENT.

All defects, weaknesses and damage existing at the time of the receipt of the goods for shipment should be noted on the Shipping Receipts and Shipping Bills.

**CARS SHOULD BE SUITABLE AND IN A FIT CONDITION FOR THE PURPOSES
FOR WHICH THEY ARE FURNISHED.**

Cars loaded with flour and other bread stuffs should be carefully examined before they are loaded to see that they are in a fit and safe condition to load such goods in, and where it is necessary to paper and cleat them on the inside for the purpose of keeping out snow and rain, this work should be properly done. We have had several large claims recently for damage to cars of flour by rain and snow, and the investigations showed that the cars were indifferently cleated, the excuse being that there was not sufficient lumber for this purpose; so you see how serious claims are liable to arise from our either being too economical or not going out of our way to arrange for the necessary protection. We have also had claims for damage to similar goods loaded in cars which were previously used for carrying coal, the coal dust discoloring the bags and furnishing the consignees with a pretext for making claims. Such cars should be dusted and thoroughly swept before being loaded with any goods which are liable to be damaged in this way. Speaking generally I think it should be assumed that the Company give an implied undertaking that cars are fit for the purposes for which they are furnished.

**LOAD GOODS WITH JUDGMENT SO THAT GOODS OF ONE CLASS WILL NOT
DAMAGE THOSE OF A DIFFERENT NATURE.**

It is important to see that no goods which are liable to absorb pungent odors are loaded in cars in which odors still remain after being un-

loaded, and care should be taken that no commodity giving any odor is placed near goods which are susceptible to damage in this way; for example, grapes should not be loaded in close proximity to tar paper; nor should coal oil be loaded near tea or sugar. It is only a short time ago I had a claim before me amounting to \$45.00 for damage to a box of confectionery which was loaded in a car containing several bundles of green sheep skins during the month of August. The consignee, who was in a hurry for the confectionery, happened to be at the station when the car arrived and was present when it was opened. The smell from the hides which met him at the door was such as to force the conviction upon him that the goods could not possibly have escaped damage and he there and then refused to take delivery. Now, the box was loaded at one end of the car, and the sheep skins at the other end, and it was thought that the confectionery would be perfectly safe. But when green hides remain for several days in a closed car during warm weather they are very liable to cause damage to other goods.

OBSERVE SHIPPER'S INSTRUCTIONS

Where packages bear instructions from the shippers as to how they should be handled and loaded, as in the case of glass, these instructions should be observed and carried out.

PROTECT GOODS FROM DAMAGE THROUGH LEAKAGE OF LIQUIDS.

Packages which are liable to leak, such as those containing syrup, molasses, turpentine or oil, should not be loaded near goods which will be damaged in the event of leakage. All goods more than ordinarily liable to pilferage, such as liquors, cigars and tobacco should be carefully weighed at time of receipt, so that in the event of a shortage being reported by a consignee, the Company will be satisfied that the pilferage occurred on the Railway and did not take place before the goods were received for shipment.

CONCEALED LOSSES.

We should try and impress upon the shippers of all goods which are calculated to excite the cupidity of dishonest persons, the importance of shipping their goods in strong boxes or cases well secured by means of iron straps, instead of in frail packages which invite and facilitate pilfering. If shippers would wire and seal such packages it would go a long way towards enabling Railway Companies to bring the responsibility for these undiscoverable losses or concealed losses, as they are called, home to the right parties.

At Junction points where our Agents are practically in the position of the Forwarding Agent, cars received from other lines leaking should be opened and examined. I had a large claim before me a short time ago for loss of acid; the car was noticed leaking when transferred to us, but our Agent allowed it to be sent forward to destination without making an investigation, and inasmuch as we were not in a position to establish the extent of the loss when the car was transferred, we were obliged under Association rules to share the loss rateably with our connections. I have no doubt that if the car had been opened and an investigation made, the whole loss would have been found to have occurred before the car came into our possession, in which case, we would not of course have had to participate in the claim.

GOODS SHOULD BE CAREFULLY LOADED.

Too much care cannot be taken by checkers in directing their men to the cars in which the goods should be loaded, so as to avoid loading into wrong cars, and when men are discovered making too many errors of this nature, they should be removed. Freight should be stowed in cars with

care and judgment so that damage may not occur as the result of careless or injudicious loading. Heavy packages should not be loaded on top of frail ones so that the goods underneath will be crushed by the weight of those loaded on top of them.

"VERA-CHECK." LOADING DIRECT FROM TEAMS TO CARS THROUGH WAREHOUSE.

I do not know of any surer or simpler method of guarding against wrong loading, where the system of loading direct from teams to cars is in vogue, than the system known as "Vera-check." The other systems aim more at locating the responsibility for wrong loading, whereas the "Vera-check" aims at stopping the trouble. A modified form of the Vera-check has been adopted at Winnipeg and Calgary stations and has been found to work well. It is briefly this:

As soon as the cars are marshalled for loading, they are given temporary numbers, which appear opposite the cars on the checkers' loading sheets; in each car there is a box containing cards bearing the temporary number of the car. When goods are received at the Freight shed, examined and sealed, etc., the checker hands the trucker a card, bearing the number of the car in which he is to place the goods, and the trucker is required to take the card back along with another card of the same number which he takes out of the box in the car, and hands both cards to the checker; if the two cards correspond, the checker is satisfied that the goods have been put in the right car; but should the trucker be so heavy witted as to put the goods into a wrong car, the card which he takes out of the box in the wrong car is evidence of the mistake, and the checker has it corrected there and then.

LOADING GOODS IN STATION ORDER.

The importance of loading goods in station order so as to avoid over-encumbrance, should be constantly impressed on the loaders, particularly at points where the loading staff is not permanent. Immediately cars are loaded they should be sealed, instead of being left unsealed until it suits the convenience of the Car Sealer to do this work.

GOODS DELIVERED WITHOUT SHIPPING INSTRUCTIONS.

At stations where the delivery of goods for shipment is made by Cartage Companies and the consignments are unaccompanied by Shipping Bills, the teamsters should be required to take the goods back for shipping instructions, or where this is not desirable, the goods should be placed in the Freight Warehouse by themselves under a printed notice reading "Awaiting Shipping Instructions." The teamsters should in that case be required to have the necessary papers on their return trip, and if they fail in this, the attention of the Cartage Company's Manager should be called to the matter, and if instructions cannot be obtained for the shipment of the goods at once, they should be returned to the Cartage Company and a proper record made of this, so that the responsibility for the goods may be that of the Cartage Company and not that of the Railway Company, between whom there is usually a contract fixing their respective duties and liabilities.

WAY BILLS SHOULD CORRESPOND WITH SHIPPING BILLS.

Waybills should be an exact reproduction of Shipping Bills. The practice of checking the Shipping Bills with the tissue copies of the Way Bills after the Way Bills have been sent out of the office is an old one and a good one, and when discrepancies or omissions are discovered, they should be corrected at once. Where it is found that goods have not been Waybilled and the car has been sent forward, the Agent should get after the goods by wire, instead of simply enclosing the Waybill to the place of destination and letting the matter take its course.

It was only last month we had to pay a claim of \$291 00 for a hundred coils of wire owing to a mistake of this nature. It was proved that 600 coils of wire were loaded into the car, but the Way Bill only called for 500; a second Way Bill was issued for the 100 coils but not dealt with properly. We received the car under seals but could not prove that the seals were all right when the car came to be unloaded at the consignee's warehouse. Evidently our checker did not check the number of coils of wire, but took it for granted that there were only 500 coils in the car, as Waybilled, and we could not get the consignees to believe that they received 100 coils more than were billed. The Contracting Carriers were obliged to settle with the Shippers and under Association Rules we were held responsible. Cases of this kind are exasperating.

ORDERS STOPPING DELIVERY MUST BE IN WRITING.

When a Forwarding Agent receives a request to stop the delivery of goods, it should be in writing and the date and time received should be recorded. These requests should be acted on at once, so that it cannot be said by the shipper that the goods were delivered at destination by reason of any neglect on the part of the Company. I shall have occasion to refer to this matter further when I come to deal with the duties of the Receiving Agent.

SHIPPER'S INSTRUCTIONS SHOULD BE SHOWN ON WAY BILL AND CAREFULLY FOLLOWED.

In the case of shipments of perishable property in car load lots, Agents should see that whatever the shippers instructions are, they are shown on the Way Bill. The shipper must be presumed to be the best judge of what steps should be taken to protect such property, and whilst it is true that the well known perishable nature of certain commodities is a sufficient notice in itself to the carrier of what is necessary, yet there are cases where risk of damage would be incurred if the matter were left to the judgement of our Agents and others. I will give you a recent case in point. A car of cabbages was shipped from Minneapolis to Calgary; the shippers gave instructions to the Contracting Line to have the car re-iced in transit; a Bill of Lading was issued on which instructions as to the re-icing of the car were inserted, but these instructions were omitted from the Way Bill: the car was delivered to this Company at North Portal with the ice only quarter full of ice, and by reason of the omission of the instructions on the Way Bill, the car was not re-iced at Moose Jaw. The Agent at Medicine Hat, however, had this done, but there was a serious loss on the arrival of the car at Calgary.

Now you will say that the Agent at Medicine Hat showed greater intelligence and better judgment, but I do not think so, for this reason; that we had carried previous consignments of cabbage in ventilated cars without ice, and the Agent at Moose Jaw might well be excused for saying to himself, "I am in doubt as to the advisability of icing cars containing cabbage, I have seen cabbage pass in ventilated cars without ice, and as there are no instructions on the Way Bill, I think I am safe in not re-icing this car and I shall not take any chances." The Agent at Medicine Hat doubtless reasoned it out in this way, "Although there are no instructions on the Way Bill to re-ice this car, it may be that if I do not re-ice it, the cabbage will become damaged and I shall get into trouble."

The remarks which I have to offer on this case are: There is no joint regulation existing between the Soo Line and this Company under which the Soo Agent at South Portal would be required to fill the boxes with ice before delivering the car to this Company at North Portal. If there was an arrangement between the two Companies, then under it, it would be understood that as North Portal is not an icing station, refrigerator cars should be filled with ice at South Portal sufficient to protect the goods to the first icing station on this Company's line which is Moose Jaw.

Again, let me call attention to the Freight Traffic Manager's Circular No. 55, Sub. Division 6-A, which reads: "When refrigerator cars are received from connectians under ice, with no instructions to ice in transit, icing is to be done at shipper's expense, and the Agent at the point the car is received from the connecting Line must make notation to that effect on the Way Bill."

Now, if this had been done at the frontier, our Agent at Moose Jaw would have no excuse.

HEATED AND REFRIGERATOR CARS.

Not a season passes during which we have not several large claims for damage to butter and eggs through the lamps in heated cars smoking and emitting soot, and I think it proper to call attention to this, so that steps may be taken to correct this source of damage to such goods. Employees whose duty it is to look after heated and refrigerator cars should be held to strict account.

SHIPPER'S LOAD AND COUNT.

At stations where Car load shipments are not checked by the Company's Agents, the Bills of Lading should be qualified by being endorsed, "Shipper's load and count, more or less," but where the shippers insist upon being given clear Bills of Lading, the Company must either provide checkers or accept the risk of having to pay for shortages which are liable to be errors in loading on the part of the shippers. The shippers say that they cannot negotiate Bills of Lading with the notation "Shipper's count more or less" on them, and we say we cannot afford to have a checker at a station for the purpose of checking a few car loads of flour, and even where we can produce evidence negating the possibility of any portion of the goods having been stolen or improperly removed from the car en route, this is never accepted as a satisfactory answer to a claim for shortage.

I have at present in hand two cases of this nature, where 80 sacks of flour were reported short from one car and 37 sacks from another, both cars having been handled from shipping point to destination under a perfect seal security. At the same time we often run a whole year without a single case of this kind, so I suppose it is considered more economical to pay an occasional claim than to maintain permanent checkers.

LIVE STOCK. FACILITIES FOR SAFE LOADING.

Agents at points from which shipments of Live Stock are made, should see that the Stock Yards and Shutes are kept in a safe usable condition; this particularly refers to the gates, fastenings, bars, etc., and loading boards.

PILFERAGE.

There is a great deal of petty pilfering going on all the time, and efforts should be made to detect the parties. It is very annoying to a consignee to receive a bunch of bananas stripped of half a dozen bananas, a pail of candies from which a handful of candies has been taken, a case of oranges with half a dozen oranges missing, or a case of whiskey with a bottle gone. A closer supervision by Agents, Foremen and Checkers would have a tendency to minimize this.

ROUGH SWITCHING AND HEAVY APPLICATIONS OF AIR BRAKE.

I will now proceed with the facts which should be observed during the carriage of Freight. In the case of "Way Cars," conductors should see that the freight in the cars is always kept properly trimmed, so that after consignments are unloaded at intermediate places, the freight left in the cars will not fall down and be damaged. While it is true that rough

switching of cars causes much damage to freight, the conviction forces itself upon me that a great amount of damage to freight en route is caused by too severe application of air brakes in emergency, and as the Assistant to the Second Vice President and other Officers of the Mechanical Department are here, it will be in order for these gentlemen to explain why air-braked trains cannot be handled without jerks and shocks.

CHECK AND SIGN WAY BILL AT FLAG STATIONS.

In the case of freight delivered at Flag Stations it is of the greatest importance that conductors check the goods from the Way Bill and make a notation reading "Unloaded as Billed," inserting the date and signing the Way Bill, and when consignees are on hand, conductors should take their receipts for the goods on the face of the Way Bills.

KEEP CHECK ON MEN IN CHARGE OF LIVE STOCK.

In the case of Live Stock conductors should make notes in their diaries of any incidents of importance and where the men in charge neglect their duties. Many of those men who are sent in charge of cattle simply undertake the work in order to get a free passage and give little or no attention to the stock en route.

COMPLY WITH REASONABLE REQUESTS.

All reasonable requests from the men in charge that the stock be unloaded en route for purposes of feeding and watering and recuperation should be complied with when practicable. It is important that I should mention in this connection that the law has made stringent provisions for the carriage of cattle in cars. If there is not proper space and opportunity for rest in the cars and the cattle do not receive proper food and water, then they must not be confined for a longer period than 28 hours without being unloaded for rest, water and feed, for a period of at least five consecutive hours. Therefore, while time is a factor in the handling of this traffic, we must not forget that the long journeys make the carriage very trying on the animals, and for this reason every facility should be extended to the men in charge, so that by their assistance, the Company shall be able to land the consignments at destination in the best possible condition.

SAFE APPLIANCES AND SUFFICIENT ASSISTANCE IN UNLOADING FREIGHT FROM CARS.

Conductors should see that all freight is carefully unloaded from cars and that no chances are taken with insufficient assistance.

Let me here say that I think it would be a good idea, if the Superintendents required a monthly report to be made to them by Agents and Conductors as to how freight is being loaded and handled.

AGENTS SHOULD BE ON HAND TO RECEIVE WAY FREIGHT.

Lastly I come to the duties of the Receiving Agents; they should be on hand when freight is being unloaded. It is urged that this is not always practicable, that Agents are engaged taking train orders and attending to other duties in their offices, but my observation is that they manage to be on hand to receive Express parcels and mail.

NOTATIONS ON ORIGINAL WAY BILLS TO BE SIGNED JOINTLY BY AGENTS AND CONDUCTORS.

At Wayside stations all shortages and damage should be noted on the original Way Bills, and notations signed by Agents and Conductors; these things should also be reported promptly, and when goods short are afterwards received, the Claims Department should be advised at once. Where claims for shortages have been paid and the goods turn up afterwards, Agents should see that the goods are not delivered.

Freight should not be left exposed on station platforms, but placed in Warehouses as soon as possible.

GOODS SHOULD BE CHECKED AT TIME OF DELIVERY.

Where loaded cars are "set out" at stations for delivery it is too often the case that Agents, when the charges have been paid and clear receipts obtained, send the consignees or their teamsters to the cars to help themselves, instead of being present to see the goods checked and correctly delivered.

CLEAR RECEIPTS FOR GOODS CLAIMED SHORT MAY BE NO PROTECTION TO COMPANY.

In cases where goods are found to be short after the Agent has got the consignee to give him a clear receipt for them, the receipt is of no protection to the Company, and Agents who take receipts in this way would better understand this and that they will be held responsible.

NOTATIONS SHOULD NOT BE MADE ON EXPENSE BILLS.

Notations of shortage or damage should not be made on Expense Bills; these forms are not intended for this purpose but simply for the purpose of giving receipts for the payment of the charges. Many claims have arisen as the result of this practice which the Company might never have heard of.

"OVERS."

When a package is over, in other words, when there is no Way Bill for it, the Receiving Agent should mark on the package the number of the car received out of, and the date in legible figures where there are no stamps in use for this purpose.

CARS TO BE KEPT UNDER SEALS.

Cars should be kept under a perfect seal security, both en route and at stations, so long as they contain any freight. Before supposedly empty cars are placed at mills or elevators, they should be examined to see that there is no Freight in them.

REPORTING OF PERISHABLE FREIGHT

It often happens that perishable goods are refused by the consignee. The instructions to Agents are that they must not allow such goods to perish on their hands. All cases of this nature should be reported to the Claims Department by wire.

WHEN GOODS ARE REFUSED AGENTS SHOULD EXPLAIN THE POSITION OF THE MATTER TO THE CONSIGNEE.

When goods are refused by consignees on account of damage or shortage for which the Company may be responsible Agents should explain to them that while the result may be approximately the same whether they take delivery or the Company sell the goods, nevertheless, consignee's proper course is to take delivery, and after the loss or damage has been ascertained to present claim.

Where consignees positively refuse to adopt this course, Agents should take steps immediately to have the damage assessed by competent persons and in this way place the Company in a position to prove the extent of any additional damage which may unavoidably take place by reason of accidental fire or otherwise, while the consignments remain in the possession of the Company refused and apportion the total responsibility as between the consignees and the Company.

Handwritten note:
 Cases where
 receipt not
 checked in
 3-12-24

Serious losses have occurred owing to the traffic being dislocated by reason of washouts. One of the first things the Superintendent should do, is to ascertain particulars of all perishable property in transit on his division, and if he cannot arrange for the protection of it himself, he should report the matter to Head Quarters by wire.

IMPORTANCE OF SEAL RECORD.

Where an Agent cannot produce the seal record of a car unloaded at his station, he should be held responsible. I have a claim in hand now, where a firm shipped a car of cement without indicating the number of bags; they came to us afterwards and gave us this information, requesting that the car be checked out at destination. We wired the Receiving Agent in good time, but he not only neglected to record the seals of the car, but turned it over to the consignee without seeing it checked out, and consignee says there were only 300 bags of cement in the car, instead of 360 as stated by the shipper, who is holding us responsible.

NOTATIONS ON ORIGINAL WAY BILLS OF ALL TRANSHIPMENTS.

When Freight is transhipped en route, and there are no tranship stamps in use, Agents should make a notation on the Way Bill of the number and initials of the new car, date and place of transhipment, condition of goods and shortage if any.

IMPORTANCE OF SECURING ORIGINAL BILLS OF LADING.

Agents cannot be too often reminded of the importance of securing the original Bills of Lading, particularly and emphatically those for goods consigned "To Order," or where the goods are consigned direct to strangers. All Bills of Lading for goods consigned "To Order" should be endorsed over to the ultimate consignees.

I recall an instance where a case of cigars, value \$500.00, billed "To Order" was refused by the consignee. Some time afterwards a well dressed man enquired for the goods; he presented his card stating that he was the shipper's traveller and that if the cigars were delivered to him, he would guarantee the surrender of the original Bill of Lading later. The goods were given to him and it turned out that he had left the shipper's employ, that he sold the cigars and absconded with the proceeds, leaving the Company to settle the shipper's claim which they were obliged to do.

AN ORDER CANNOT CARRY THE EFFECT OF A BILL OF LADING.

Agents should never allow an order to be substituted for a Bill of Lading of this nature, as it is an attempt to give an order the effect of a Bill of Lading, therefore great care should be taken as to other proof of ownership.

I call attention to this for the reason that it is the practice on Railroads in the United States in connection with the Waybilling of "Astray" freight, to insert on the Way Bill the instruction, "Deliver only on presentation of original Bill of Lading or other proof of ownership," and as these belated goods may be consigned "To Order," the risk should not be incurred by delivering them on presentation of any other proof of ownership than the original Bill of Lading. Indeed, the better and safer course for the Company to pursue in all cases, is, on delivery of the goods, to take up the Bill of Lading or Shipping Receipt under which the goods were carried, whether made to order or assigns or not. But it is not customary to insist on the surrender of the original Bills of Lading where the goods are consigned direct to consignees who are well known and solvent.

For the information of Agents let me state that the surrender of the

Bill of Lading can be insisted upon before the Company can be required to part with the goods, and the grounds for this are that confidence must be placed by one of the parties in the other where the goods are bulky and the exchange of the goods for the document cannot possibly be simultaneous, and that if the party having the goods were to make the delivery before receiving the document, he would expose himself to the risk of the document being transferred to third parties by a second sale of the goods. I am glad to know that our Travelling Auditors hold Agents responsible for the original Bills of Lading representing goods consigned to order.

ORDERS STOPPING DELIVERY OF GOODS.

Regarding orders to stop the delivery of goods; it is the last remedy which an unpaid shipper has against the goods, and is a right which arises solely upon the insolvency of the buyer based on the plain reason of justice and equity, that one man's goods shall not be applied to the payment of another's man debts. The subject covers a field of fact of such variety that it would be out of place here to dwell upon it further than to say that the shipper in such cases is so much favored in exercising this right, as to be justifiable in getting his goods back by any means not criminal before they reach the possession of an insolvent consignee, and all the Company requires is some act or declaration of the shipper countermanding delivery. Agents should withhold delivery of the goods in such cases and immediately ask for instructions and when an Agent is being transferred, he should make it his business to draw the attention of his successor to any consignments which are being held on orders stopping delivery. Not long ago the Company were obliged to settle a claim for a large consignment of boots and shoes; the Agent received the order to stop delivery and was transferred before the matter was settled. The succeeding Agent was not advised and evidently the consignee, surmising that the new Agent would not know anything about the trouble, applied for the goods and got them.

OVER FREIGHT.

At large stations when freight is received over, the crayon marks or numbers if any, should be recorded as well as the full address. If not addressed, all marks, old and new, should be noted, and where there is nothing to indicate the contents of packages, they should be carefully opened and the contents recorded. All packages opened should be carefully resealed immediately. Where over freight is received fully addressed to other points, it should be sent forward without delay as per Third Vice-President's and Freight Traffic Manager's Joint Circular No. 36, dated 12th of September, 1904. Under no circumstances must over freight be delivered from the shed without the surrender of the original Bill of Lading, unless specially instructed otherwise by the Agent, who may in some cases receive instructions from Head Quarters to have this done.

If over freight, such as castings, cannot be properly described, a rough sketch of it should be given, and when inquiries are received from other stations regarding freight that is short, and there is anything over without marks or addresses, but which corresponds in some particulars with what is inquired for, the best description which can be given of it should be furnished, as the names of some articles do not convey a proper or adequate idea of what they are like.

The prompt notification of the office of all over freight is important, so that inquiries there may be answered with a full knowledge of what freight is actually on hand.

SHORT FREIGHT.

When goods are found short the premises should be diligently searched without delay, as there is always a possibility of the missing goods

being received out of other cars without this being discovered at the time, and all over freight on hand should be carefully examined to see if any of it correspond in any respect with what is short. This will prevent delay in the disposition of over freight and render the issue of many over and short reports unnecessary.

Where short and over reports have been issued and goods reported short or the Way Bills for overs have been received, the office should be notified at once for the purpose of stopping further tracing.

BAD ORDER.

When packages are received in a condition inviting pilferage, they should be recovered immediately, and in cases of damage, the probable cause, nature and extent of it should be recorded. Theories indicating negligence on the part of the Company should not be indulged in, but a simple statement of the facts made in each case.

CARS WITH BROKEN SEALS SHOULD BE REPORTED.

When cars are received with broken or imperfect seals and there is any reason to think from the condition of the contents, that there has been a robbery or a pilferage, the matter should be reported immediately.

I have now stated some of the facts which if observed, will prevent serious loss to the Company; there are many more, but as I stated at the outset, I do not make any pretention either to originality or to fullness. What I have stated will serve its purpose, if in any degree it will stimulate us to greater effort, and I shall watch for the fruit of this discussion with much hopefulness.

Chairman,—Mr. D'Arcy has given us a very full report on the duties of all concerned in the handling of freight and how to protect the interests of the Company in the matter of claims. Mr. Greer, General Freight Agent, at Vancouver will be able to give some further information on this important subject.

Mr. B. W. Greer,—The subject is how to reduce claims, the discussion of which I have been requested to open. The subject has been very thoroughly gone into by the General Claims Agent. A great many important features have been brought out, but how to make them effective is an important matter. We can see very often how a claim might have been prevented, after an investigation has been made. A large percentage of them are the result of carelessness on the part of some employee. We have a book of instructions to Agents, but it is not up-to-date, not having been revised or reissued since, I think 1899,—and I would suggest that it be revised and many new points developed in Mr. D'Arcy's paper can be worked in to advantage. In any discussions had here, many new and important ideas may be brought forth, but these will not be of any use unless in some way transmitted to Agents and others who handle the traffic. It is for the Officers to lay down certain rules and instructions for employees to follow, and also equally important to see that these rules and instructions are carried out. I would suggest that a Committee be appointed to draft a new set of instructions, revise the present book of instructions to Agents, having chiefly in mind the prevention of claims,—it should be the aim of every employee to avoid possible claims, but when claims are made against us, it is the duty of the Claims Department to investigate and decline to, or pay as quickly as possible so as to avoid irritation of shippers and possible loss of traffic, for the prompt handling of claims, has a great bearing upon the securing of competitive traffic, which every one on the Traffic Department is fully aware of, as also, I believe everyone connected with the Claims Department. I am of the

opinion that in dealing with small claims, it might be a good idea to adopt the practice of some American Roads referred to by Mr. D'Arcy of payment without investigation. Investigation, however, may bring out the cause of the claim, which is necessary in order to prevent future claims of a similar nature. This investigation if necessary can be made after the claim has been paid, the claimant not being so much interested in how the loss occurred, as in receiving prompt payment. There are perhaps more heavy claims in connection with Refrigerator traffic than any other, and in the majority of these claims the responsibility rests either with the station staff or the train crew, in not seeing that the cars are properly iced. The responsibility should not rest with the Agents alone but the conductors as well. It should be the duty of conductors before taking the train on which there is perishable freight, to see that it has been properly cared for.

In regard to the settling of claims, the amount of a claim which may be paid by emergent voucher is limited by the Third-Vice President. On the Pacific Division a claim exceeding \$50.00 cannot be paid by emergent voucher. We may explain to the claimant that this is our regulation, but he does not admit our right to say that if we owe him over \$50.00 we cannot pay him the amount as promptly as if the claim was under \$50.00.

Mr. H. E. Macdonell,—In agreeing with Mr. Greer, I would like to say that everything possible has been done by the Traffic and Operating Departments to prevent loss or damage, by giving instructions to agents and issuing circulars.

Mr. Greer mentioned our trouble with the refrigerator and heated car service. The heaviest claims in my district have come from cases of perishable freight spoiled in transit, and in my opinion it was always brought about by neglect on somebody's part in regard to icing or attending to heaters, and it has always been hard to find out who the man was that neglected his duty. As agents at inspection points are supposed to report that they have inspected ice bunkers or heaters, whichever the case may be, and damage yet occurs, it means that in some cases reports are not correct. These reports are made incorrectly, deliberately. I would suggest, therefore, that agents at inspection points break seals of trap doors, and report seals thus broken on way bills. The way bill at destination should show the report of seals of each inspection station, or would show any omission, which is the point. I think also, all refrigerators should be equipped with thermometers which could be read from the outside through thick glass.

Mr. F. W. Peters,—Much dissatisfaction to our patrons and embarrassment for ourselves would be avoided if better attention to correspondence in connection with claims was paid not only by agents, conductors, etc., but by superintendents themselves. Claims that are not unfrequently paid at the request of the Traffic Department are described as "Policy" claims. There should be practically no policy claims. Any of those described as such should either have been paid months or years before, or declined with the production of proof as to our non-liability which would be acceptable to the claimants. This would be the condition if full and explicit information was given to the Claims Department by the men who handled the goods. A superintendent's turn-down on the corner of the letter, reading, "Herewith agent's reply," or "Note conductor's statement" may in some instances be sufficient information for the Claims Agent, but not always so. An agent or a conductor when asked for his report in regard to a shortage or bad order, being only human like the rest of us, is not anxious to make statements that will incriminate himself or his staff. An answer, which may appear as answering an inquiry but which does not give the full and absolute facts in regard to handling will frequently be given, if it is thought such answer will

go. I hold that it is the superintendent's duty to develop all the facts in an investigation regarding damage or loss of goods. If he thinks an agent is evading a point or trying to shield a subordinate, he should press the investigation so as to develop the facts, instead of letting such a reply go in and leave the Claims Agent to deal with the claim without having the full facts. The result may be that the Freight Claims Agent declines the claim, feeling he is justified in doing so on the record. The shipper is dissatisfied, he broods over what he considers an injustice, and the next thing we know he is punishing us by patronizing our competitors, and when asked for a reason he gives it. Then we are put in the embarrassing position of having to re-open the case, and because of the lapse of time are unable to develop the facts which might have been got if properly handled when the matter was fresh in the minds of our men, and we have got to give the claimant the benefit of the doubt and pay the claim, which I say is described as a "Policy" claim. I hope our superintendents will realise our position.

What I mean is,—An agent asks his checker in regard to some damage or shortage and on getting his statement, he gives a reply as favorable towards his staff as he can. The superintendent accepts that statement without further investigation or inquiry. I do not say that he intentionally shields a man who is at fault, but he does not develop all the facts, and I venture to say our Claims Agents have many cases where they have developed further facts by subsequent investigation. Another trouble is the delay on the part of agents in returning papers with their reports. They have got to look upon such work as something which should be attended to after everything else is done, that is, they devote their spare time to answering such correspondence, after they get through with their audit returns, their express work, their commercial telegraph reports, etc. If an agent is understaffed, as I believe some of them are, and in consequence important work is delayed and the Company's interests suffer, I consider it false economy, and superintendents should be thoroughly posted as to the amount of work to be done at each station and the staff necessary to do it.

The larger the claim the more important that it should be paid promptly. We may owe a consignee a large amount of money for damage to his goods—he on the other hand has to pay for these goods, and pay our charges on delivery. Very often if a claim can be promptly paid consignees or shippers are willing to compromise rather than wait six months or a year for their money, and in that way a saving can be effected.

In regard to refrigerator service, no doubt the officers of the Operating, Car Service and Claims Departments may have some suggestions to make which would eliminate a great number of such claims.

Mr. J. Jones,—I think, Mr. Chairman, if you will call off that five minute limit, I can give you many instances where proper reports in regard to handling of freight have not been made and where the superintendent has not, either through lack of time, or through the carelessness of his own clerical staff, obtained for the Freight Claims Agent, the proper information in regard to such matters. We look to the superintendents for the information we need as to handling of freight either at stations or by the trainmen and to apply a remedy when reports are not issued, improperly made out or correspondence unduly delayed. We do not get proper attention and the result is delay in getting at the facts and adjusting claims, frequently calling forth complaint from the Public, the Traffic Department, and the Management.

Mr. F. W. Peters,—My experience in dealing with matters of this kind shows me that it is not carelessness so much as ignorance and a lot of this ignorance is legitimate; therefore, I may fall in with the suggestion that is proposed for getting such instructions to the agents. They should

be made very concise and in such shape that the agents will read them. I think we might go a step further and have a question paper for the agents to fill in and pass a sort of examination which will show whether they have read the instructions or not. I think in this way we can get a very great deal of benefit and know that our agents are posted.

Mr. J. A. Macgregor,—I would like to know what set of questions or instructions would cover a case of this kind, which is one of actual experience. In the month of December you will recollect it was comparatively mild in Winnipeg and was mild to the south and east. Fish was being shipped from Winnipeg Beach in large quantities, and the shippers would not ice the fish at the shipping point, and I would not allow it to go forward from Winnipeg without being iced and ordered them to be held twenty four hours in Winnipeg for icing. Meantime I entered into correspondence with the Booth Fish Company of Chicago and asked them to authorize the agent at the shipping point to ice the cars, but they refused to do so, saying that they would not pay for the cars that had been iced and that this would be authority not to ice any shipments until the 1st of April, although the weather turned cold, and about the 18th of January I received most positive instructions from the Booth Company in Chicago to ice all their shipments of fish from Winnipeg Beach. What was the cause of this? The cause was that one of the cars, after receiving their instructions to let the cars go forward without icing, arrived at Buffalo with the fish in bad order.

The instructions to ice the shipments came immediately after that. What set of instructions would you give to any agent to cover a point like that? These are actual facts, Mr. Chairman.

Mr. F. W. Peters,—If I may speak again on this important question, I should like to answer the question Mr. Macgregor asks in reference to the icing of refrigerator cars. I think the case he puts can be very easily answered. The instructions in regard to handling refrigerator traffic were fully revised on the first of this year and appear in the Freight Traffic Manager's circular. These distinctly define the duties of the agent at point of shipment before signing shipping receipt for a car of refrigerator freight he is called upon to obtain from the shipper written instructions on the face of the consignment note as to whether the car is to be re-iced in transit or not. If this shipper endorses "Not to be iced in transit," we are not called upon to ice it and should not do so, with this exception: Should it be a class of freight which will be injured through heat (and of course we assume it would be such freight if shipped in refrigerator cars) and if the car through wash-out or other accident is delayed en route, then it is our duty to protect the property by icing the car. Should the shipper, as we have known them to be, unreasonable and refuse to endorse any instructions in the matter of icing, then an agent should qualify his receipt in such a way as to relieve the Railway of any responsibility, barring detentions such as I refer to. There is, however, one thing our Car Service Department may be quite assured of,—if in case of doubt they instruct that ice should be supplied when it need not have been, they will never find this Department blame them. It is a case of "In doubt, take the safe side."

Mr. J. S. Lawrence,—I just wish to say a word with regard to the icing of cars. Mr. Macdonnell has stated that the majority of claims that he has to deal with are the result of not icing cars. Now, the agents on district No. 3 have very positive instructions with regard to the icing of cars, and I would like to know if investigation brought out the fact that the damage occurred after the cars were received by us at Nelson.

Mr. H. E. Beasley,—As you know, at many divisional points we have not got a sufficient local staff and I have had cases under investigation where

I have records showing that cars had been examined here and iced there, when, as a matter of fact, intervening stations showed "no ice" in the bunkers at all, and on investigating further, we would find that the agents sometimes were "cooking" the records.

As an illustration a train comes in at 23 o'clock, perhaps there is a night inspector and a helper at that station. The train is ordered out by the dispatcher in an hour. The inspector has to go down the train to inspect and see how the ice is, then up to the ice house, get a couple of tons of ice out, and if he can take a chance he will leave the car till the next icing station, and the man there may be in the same fix. At North Bend last year where we had one car repairer and a helper at night, we have had to turn the section gang out and pay them time and a half and they would complain next day about not getting proper rest. I think the chief difficulty is in not having an adequate force for the work. In order to provide for that and avoid extra expense of icing, I would suggest that in our next circular of instructions that we inaugurate a system for the last icing station to advise the next one that so much ice will be required. This will enable the agent to have his force ready and save time and ensure the icing being properly attended to.

Mr. T. Kilpatrick,—I might mention the weakness which exists regarding pilferage and loss of freight. Now, on my district, and I suppose on a number of the others, we have very few operators compared to the mileage, and at night there are still less. When a train comes along the road with two or three carloads of wayfreight, it stops at some way station. The trainmen open the seals and deliver the goods, and the car cannot be sealed again. It is brought into the yard, put on one of the back tracks and remains unsealed until the checker gets the bills and sees "no seal". In the interval there is plenty of time for pilferage, and no way to discover the perpetrator. I would suggest that conductors be given some form of a seal press, they might use the ordinary or special seals, and that they should see that the car is sealed again, the car of course, to be re-sealed at the first point there is an agent. I think that would cover up the weakness. Regarding the other matter touched upon by previous speakers, I do not know exactly what Mr. Peters refers to. As far as I have had to do with investigations from neglect to ice cars, etc., it has always been done as quickly as possible. Those interested will try and make statements to clear themselves if possible, though there are exceptions. With regard to the facility of icing as mentioned by Mr. Beasley, and the time it takes, is a question that should receive the attention of the management, to provide better icing facilities. In a point like Revelstoke, we handle a great many cars requiring icing. There is an ice house, and until recently it was a question of carrying the ice up a ladder. If proper icing facilities were furnished and the men could quickly put in the amount of ice required, there would not be so many omit the icing of cars.

Mr. W. Cross,—You have apparently overlooked the fact that in Mr. D'Arcy's paper he laid the responsibility of most of these claims on the Mechanical Department, although throughout the balance of his paper he dealt with the subject. I think the Mechanical Department might say a few words in defence of this.

Chairman,—That is so. Mr. D'Arcy did mention the Mechanical Department specifically.

Mr. J. Cardell,—I think by the way Mr. Cross is looking over this way that he wants me to say something on the matter. Mr. Winter made the statement that he had a great deal of trouble leaving Fort William and coming west and endeavored on the way to locate the defective triples, which he failed to do after numerous attempts. When I was on the

Central Division we had the best inspector on the Division located at Fort William and he said if he could not find the defective triples I have no doubt it would be a difficult matter for any of the trainmen to find them. Mr. Winter says it took them two and a half hours to find the defective triples when they arrived at Ignace—at least I so understood from what he said—and it would be interesting to know just what was wrong with the triples. The first excuse from the engineer for rough handling of the brake is that there is a defective triple on the train. The trouble is frequently with the engineer himself. I have frequently been on a train having defective triples and have had a drawbar pulled out between Laggan and Canmore or Calgary and I have traced that train after the drawbar has been repaired through as far as Swift Current and have never found any defective triple or had any accident afterwards. In case of a drawbar being pulled out the cause that is generally attributed is that of defective triple. We find usually that the defective triple is caused probably through a triple that is not quite as sensitive as the majority, and the first application of a brake did not take off sufficient reduction to make this triple act and then when they took off a five or six pound additional reduction, this triple acted and resulted in a violent shock. My advice to the men that I find in that way is to make sufficient reduction to ensure the application of all defective, sticky or lazy triples going into action, then when it is necessary to release the train, let them stop and go ahead. They very soon get into the habit of doing away with a lot of this violent braking, and destruction of drawbars, etc.

Mr. C. H. Temple,—I do not think I can add anything to Mr. Cardell's remarks. There are many reasons why the triple will cause a train to go into emergency and produce damage to the goods in the train. But it is generally known, I think, by all that a big effort is being made to take care of the air brake equipment on our rolling stock during the summer months on the Central Division. More of that work was done this year than has ever been done in any previous year on the Central Division, and yet in spite of everything that can be done, triples which are defective, or lazy as Mr. Cardell very properly puts it, will cause a train to go into emergency. This is something that can sometimes be prevented by the engineer if he is watchful and careful enough to apply his brake as outlined by Mr. Cardell in making the one service application do for the stopping and controlling of the train. Now, I do not know as I can say very much more in connection with this, Mr. Chairman, than what has been said, but I think that everything is being done that can be done to work up our Westinghouse air brake equipment on cars.

Chairman,—We will now declare the discussion on this subject closed.

Round House Practice

BY C. H. TEMPLE

MASTER MECHANIC CENTRAL DIVISION CANADIAN PACIFIC RAILWAY

The above subject is one on which a great deal can be said, as is also true of any other branch of the railway service to-day.

In dealing with this question I will begin with the roundhouse first. It has been my experience, owing to location and conditions no set method or practice can be laid down or followed that will apply fully to all roundhouses on the different sections. In this particular the handling of power from train to shop and from shop to train is affected.

The round house should at all times be kept neat and clean; anything in way of scrap, material, or tools should be taken care of in a place provided for the purpose. It is also essential that it should be well lighted at night as well as day, as the same results are expected at night as in day time. Another very important matter in connection with roundhouses is the heating. In a climate such as we experience on the Central Division, an incoming engine, which is very frequently coated over with ice and snow, should be thoroughly thawed off in forty-five minutes, which would facilitate the work of making the engine ready for the road again, also make it possible for inspection to be made by the shop, which inspection engineers are released from when bringing engines in under some circumstances.

Another important point in roundhouses is proper circulation of heat and overhead ventilation. The former should be arranged so that all parts of the house will be of the same temperature; also that extra volume heat can be turned on from the ends of the pits underneath the engines, to facilitate the thawing out of same. Good ventilation is also a very important and essential feature so that waste steam from the engines, more especially when the process of washing out boilers is going on, can be taken care of and shops made so that the men can see to go around and do the work of preparing engines for the road. In this connection I am glad to be able to report improvement made in Winnipeg roundhouse this year over its condition last year, and hope for further improvement before next winter.

Turntables should be maintained in thorough repair at all times and kept free from ice and snow in winter; that is those not protected by being covered in. Very often a foreman has a late engine to account for owing to a derailment, or having to resort to a cable to turn engines around on table. In a climate such as we experience at most of the points on the Central Division, I cannot too strongly recommend that the turntables at the principal points be covered in, thus doing away with necessity of having to open the doors when turning engines in and out, as it is by the opening of doors the shops are cooled down, and in extreme cold weather the interior of roundhouses are almost continuously enveloped in cloud of steam, so that at times it is impossible to discern the numbers on engines when walking by them in roundhouse. By this you will see the difficult proposition in handling power under these conditions. While the shop doors at the beginning of the season may be made to fit perfectly tight, very soon they are in such condition from the accumulation of ice and snow around them that it is almost impossible for any heating system to keep the shed heated at the entrances to shop against the cold which is coming in at openings, caused by ill-fitting doors which have been disarranged on account of ice accumulation that cannot be avoided. This condition is a

continual source of expense during winter months. This, together with the extra amount of fuel and then not having a warm shop, is, I think, the strongest argument that can be offered in favor of having turntables covered in, thus doing away with shop doors altogether.

Good and sufficient water supply at roundhouses at all times is essential, more especially in a district where boiler washing is a necessity every round trip engine makes, such as prevails on some sections of Central Division.

An engine arriving at a terminal should be promptly released from train and her road to shop made as short as possible. Storage tracks for engines at terminals is also a very important feature, the extent of same depending on how many and the way trains depart and arrive. If in fleets so that they arrive faster than they can be taken care of on incoming shop track, more shop trackage would be necessary. At all roundhouses there should be provided an incoming and outgoing track leading from turntables.

In handling an incoming engine into shop, the plant should if possible be so arranged that engine would first be supplied with water; then tender filled with coal; next engine sanded up, when she is ready to have fire and ashpan cleaned and run into shop. All the above plant should be located in order named on the incoming track to shop, and the ashpit located close to shop to avoid as much as possible having to move engines around with fire dumped, as this practice contributes to flue and fire-box trouble much more than anything else in handling power at roundhouses.

The operation of giving engines water, coal, sand, cleaning out fire and ashpan, together with engineer's inspection, should not take more than forty-five minutes.

The engine now in the house is ready to receive repairs as booked by engineer and to be made ready again for service. All work on boiler, or work that will interfere with the getting up of steam should receive first attention, as well as other work promptly attended to, always keeping in view the fact that it is better to have power to offer than to have business waiting on it.

It is always good practice for the roundhouse foreman to come in touch with incoming engineers, as very frequently by so doing time is saved in turning engine out.

The work of getting engine ready for the road being done, fire should be lighted and steam raised as rapidly as possible without injury or damage to the boiler. In this connection, at the principal points on the Central Division roundhouses are equipped with hot water wells, so that in event of boiler being washed out or refilled with water, it is filled with hot water, thus making it possible to force the fire more than could be done if boiler was filled with cold water.

The engine now under steam should be supplied for train on departure track fifty minutes before advertised departure of train, and crew should be called in sufficient time to enable them to be on duty a clear forty-five minutes before their advertised departure. For passenger trains at points where station is situated some distance from roundhouse, as at Winnipeg, crew should be on duty one hour before departure of train.

Careful record should be kept by each locomotive foreman of the condition of the power running out of station and duly reported to the master mechanic on prescribed form. When condition of an engine warrants general repair being made, by consulting road foreman and engineer, the foreman should immediately set up a report of repairs required to engine, embracing all parts and detail on forms provided for the purpose; such forms to reach repair shop in advance of the engine to enable the shop superintendent to arrange for the engine coming in.

In connection with plant at roundhouse for maintaining power. This is something that has to be determined as the situation presents itself. At isolated points I consider that facilities should be provided so that a fore-

man can help himself instead of having to send into headquarters for something that he could manufacture in a short time if he had a machine to do it on. In this connection I have at times experienced some serious delays having engines held up waiting for material from headquarters, which for different reasons has not been forwarded as promptly as it sometimes should have been. I consider that material requested for outside points, especially that wired for, should at all times receive preference and prompt delivery.

In connection with material ordered on stores from roundhouses for maintenance work. This should be forwarded in much less time than it has been my experience on numerous occasions to see it done, when by so doing very often delay to power and unnecessary expense would be avoided.

In conclusion I can only say that for good roundhouse practice, and in order to turn engines out to make a successful record over district, it is very essential to have a good live foreman in charge of the roundhouse and sufficient experienced help under him to take care of the situation.

Mr. J. Cardell.—In the first place I am in accord with most of the points raised. As stated the conditions at the different roundhouses would prevent any set rules for operation.

In addition to what has been said in the paper just read, my idea of a first class roundhouse is, one covered in and only two outlets, with water tanks or cranes, an ash pit, a coal dock and a sand house at each entrance placed conveniently. The shorter time the doors are kept open the warmer the house can be kept during the winter months.

It would be impossible for me to agree with Mr. Temple that the ice or snow on an engine should be thoroughly thawed out in forty five minutes, to do this, would have the house too hot for doing work. It might be practicable, however, where engines run shorter distances and warmer eliminates than is experienced between Fort William and Laggan. When you consider that engines are running from 150 to 180 miles over a section, in service all the way from 12 to 20 hours, burning from 12 to 20 tons of coal, the delay putting engines into the house, and the time it takes for them to thaw out so they could be properly maintained is much more than what is generally allowed.

I quite agree with the point raised that proper circulation of heat and overhead ventilation should be procured, but how to get it is the question. It is a difficult matter to get an even temperature and have doors opened to change engines, as frequently as demanded by the traffic. While shop ventilation is a good idea to relieve the smoke and steam, at the same time the heat must go with it.

In regard to washing out of engines, I would approve of two wells for that purpose, one for emptying the boilers into for washing-out purposes, and the other for filling the boilers. This would in a measure do away with a great deal of the steam experienced from the present method of allowing the hot water to empty into the pits.

I quite agree with all that has been said about having the turn-tables covered in, but for the fact that all divisional points are so constructed that it would entail an enormous expense to make the change at present. How to keep the doors thawed out so as to close properly under the present system is a problem and I cannot see anything for it but getting heat placed across each entrance where the Sturtevant system is in use and a drain to carry the water into the pits, that part of the house being kept as warm as any other.

Good water would be the greatest boon that could be applied to the main line of the Western Division and would remove an enormous annual expense washing out.

Storage tracks are a necessity at all divisional points at present, the shop accommodation not being sufficient causes engines to stand outside waiting an empty pit so that the next in turn can be put in.

Do not approve of water being taken before engines are put in the shops.

The conditions prevailing on the Western Division will not permit of engines being coaled, sanded, fire cleaned and ash pits raked out in forty five minutes, except probably on some sixty five per cent. engines on a short run. My experience has been that the coal in use forms too much clinker for this, together with the leaky flues, side stays, etc., cause ash pans to freeze up and I have seen it take one hour and forty five minutes after the engine is put in the shop to break the clinker and shovel it out through the door. When these conditions prevail you can readily understand the difficulty. It has been intimated that engines be put in the house and then have fire cleaned and ash pans raked out rather than cause delay on the ash pit, but to those who are of that opinion I would just like to ask if they have considered the result. As I have already stated, the engine houses at times are congested, and the results would be that during a period of severe weather it would only be a short time before every pit in the round house would be full of clinkers as it is impossible at times to clean the ash pan until thawed out, consequently that in the pan would be dumped in the pit as well as what was in the fire box.

ENGINES IN THE ROUND HOUSE READY FOR REPAIRS.

The first essential step is to get boiler work done, but where so much washingout prevails it sometimes occurs that the washout men have to wait on the boilermakers and vice versa, the same applies to other repairs.

ENGINES READY FOR THEIR TRAINS.

It must be borne in mind that the enginemen's schedule covers the time for coming on duty, and they, as a rule occupy all the time allotted to them. The passenger engines at Calgary should be at the station 20 minutes before starting time, ready for service, but the difficulty is in getting the crews ahead of the prescribed time.

PLANT AT ROUND HOUSES.

The difficulty in this matter arises in not having sufficient material in stock at sub-divisional points, in fact, there is great difficulty in getting sufficient at Divisional points to properly expedite the work. One great draw-back to this is the many different types of engines, causing a heavy stock to be carried, so that, when there is a surplus in stock the question is immediately raised as to why.

MATERIAL ON ORDER FROM THE STORE.

I can quite agree that in many cases too much time is lost waiting material that has had to be wired for, the store cars being held too long on the road and delay getting it started from Winnipeg. I can quite understand that if all the material ordered by wire was sent by baggage, there would be times when the baggage car would be nearly full, but some arrangement should be made so there would not be so much delay.

In conclusion, clean tidy round houses are essential and where there is a good live Foreman he will see that such is taken care of.

Mr. J. Brownlee.—We have one ventilator at the Moose Jaw round house, which has done excellent work. The General Superintendent has promised four or five more which I think will keep it as clear of steam or smoke as any in the country.

Mr. O. O. Winter.—I will speak of a round house which is not a round house, but an oblong house with one door in it. I cannot see why such a structure would not be entirely practicable. With a house of this design, a travelling table in the center, and stalls on each side, you would secure a building of cheaper construction which could be more easily heated and kept free from steam and smoke and from which engines could be handled as quickly as by the present methods. I have not yet seen any of the present designs of round houses without the doors full of cracks and sprung from their jambs; this with the continual opening of doors, letting in the cold and the heat out, is an expensive boon to heat and

maintenance. The engine house I suggest would be an ideal one for a cold country and I would very much like to see one given a trial.

Mr. J. E. Schwitzer. — I agree with Mr. Winter in regard to the design for a round house; several are being built south of the line now.

The ventilating of such buildings is quite a problem and I am not sure that ventilators or smoke jacks will remedy the trouble. I am of the opinion that these sheds can be better cleaned by a system of forced draughts.

Mr. J. Cardell. — Regarding the sealing of round houses, at Calgary where one section is sealed there is more condensation than in the part not sealed.

Mr. S. Phipps. — I have not experienced on the Pacific Division, the same trouble as Mr. Cardell. Where the ceilings are of plaster the trouble is less. The question regarding ash pits has been taken up with the General Superintendent. When engines bunch together you must have facilities to handle them, and also to give a proper chance for examination. I think an independent pit for engineers to examine their engines on would be an improvement. Engineers could then have no excuse for neglect as the fact now is that they seldom go under the large classes of engines at the terminals on account of difficulty in getting under.

Mr. C. Carey. — We require a different style of round house. We should have one built with, say, 15 or 20 engines on one track and at the length of each engine doors. That would overcome the present trouble and help the repairing of engines which could then be got out in five minutes instead of an hour and a quarter. We should get better results and do the same work with half the staff.

Mr. S. J. Hungerford. — All practical railroad men understand this situation and its difficulties. Engines stand outside hours before they can get inside. When such occurs there is too much traffic for the facilities and no results are obtained from a surplus amount of power. In such cases the smaller engines should be stopped and the larger moved more freely.

Regarding the heating and ventilating of round houses, I may say that I do not know of any occupation more dangerous to a man's welfare than running a round house under present circumstances. At Winnipeg I am erecting a system of induced draught to remove smoke. It will not be expensive and I anticipate it will be effective.

The tool equipment requires improving. In all round houses there are some good things, and the Locomotive Inspector would help the foremen if he would give sufficient time at each round house to establish a good system in connection with the storage and use of tools. Master Mechanics are very busy men and not able to give the necessary time to such details.

In the matter of supplying material, I have found a great confusion over pattern numbers. These we are endeavoring to get straightened out now, but it increases our work in getting out supplies.

Mr. R. R. Jamieson. — Regarding surplus power. At Calgary owing to branches not being fit for heavier power, certain engines accumulated, but as soon as track conditions were improved the engines were changed. It has been my experience in many cases that when a rush of business came, we were short of ash pit accommodation. What is the best has been well set forth, every engine going to or coming out of the round house should be able to pass over an ash pit and get water outgoing on the line of its movement. We require larger round houses. That the covered-in round house where a complete circle is put in would be better in this country there does not seem to be any doubt. Turn-tables are too small; we require larger ones, even larger than those we are putting in. An eighty foot turn-table and round house to match is the need of the immediate future.

*100 feet later required
A. R. R. 12-1-12*

The Saving Effected by Grade Reductions

BY F. F. BUSTEED

ASSISTANT CHIEF ENGINEER WESTERN LINES, CANADIAN PACIFIC RAILWAY

In presenting this paper, "The saving effected by grade reductions" the general question is the one that will be dwelt upon instead of a particular proposition, though I will use the latter aspect of the case as an illustration of the possible saving under certain conditions.

The question of reducing grades over a certain section should be considered advantageous or economical when the saving effected in operating per annum over the section, due to grade reduction, more than represents the interest on the capital outlay necessary to make the reduction. In arriving at this conclusion, the cost of the work, the cost of operating and the tons hauled, which represent the gross earnings, have to be considered.

Figuring on the traffic being the same before and after the revision, the most economical location to make is the one which will require the least outlay for construction, and which will reduce operating expenses by an amount more than sufficient to pay interest on this outlay.

The essentials entering into the details of location affecting operating expenses are the grades, distance, curvature and rise and fall, which are given in their order of importance, and not to forget a point often mentioned, though it also affects the cost of construction, width of cuttings, and how they should be sloped, which is applicable in a country where blizzards rage and snow fences are of no account.

When making an estimate or calculation as to whether a grade reduction is justifiable, certain values are used for rise and fall, for curvature and for distance, in comparing the lines, and when this is done the gross tonnage is used, and the number of trains required to haul the same after the reduction is made, is figured out to finally decide the question.

As the starting resistance of a train on the level limits the weight of the train, a speed limit being given of ten miles an hour, no advantage is gained, except in a reduction of time, in reducing a grade below .4 of 1%.

It has therefore, been the endeavor on our lines to reduce the grades to a maximum of .4 of 1% virtual. This has been done except where it was deemed advisable to use "pusher grades," where it would not now, or in the future with greatly increased traffic, pay to make the reduction, either on account of the exceptionally heavy work involved, or on account of the greatly increased length of line, where the interest on the cost of construction or for operating the increased distance, would much more than pay for the pushers over that grade.

In locating pusher grades, the grade should be uniform and continuous, so that the pusher engine can be kept continuously at work. The rate of grade should be such as to require the full power of the pusher engine in addition to that of the regular engine to handle the maximum load over the balance of the section, as this will reduce the length of the pusher grade and consequently the pusher engine mileage.

The question of whether virtual or actual grades should be used, has been often discussed and the opinions of eminent engineers differ on the subject. On the one side it is claimed that the momentum of a train which can be obtained at the foot of a grade should be used to carry it to a certain height, or velocity head as it is called, due regard being given to the speed which is necessary to do this, and which is fixed at some safe limit. By the adoption of virtual grades much lighter work can be obtained and the cost of the grade reduction reduced to a minimum. On the other hand, actual grades are recommended by some, because, it is argued, if a train stops upon a momentum grade it will not be able to start upon that grade, but for one train which would be called upon to stop on a momentum grade one hundred trains would go over without stopping. The objection too, which is put forward against "running for a grade" cannot be considered when a safe limit of speed is put upon the train at the foot of the grade. Bad weather conditions and poor conditions of power are put forward as reasons why momentum grades should be introduced, but these adverse conditions apply with greater force to long ruling grades than to the shorter steeper momentum grades, as adhesion and steaming power are taxed more, or taxed longer, on the former grade, if momentum grades are not the ruling grades under favorable conditions.

It must be understood that the estimate of saving through grade reduction may be entirely erroneous unless these momentum grades are actually operated as such, when virtual grades were used in the preparation of the estimate for the scheme of grade reduction.

While a scheme of grade reduction might be figured as a paying investment, using light engines, it might not pay to reduce the grades if heavier power were used, on account of the lesser number of trains necessary to move the tonnage over the section in question, and therefore in estimating on what saving can be made it is necessary to know the power which will be used.

As many items of operating expense will not be affected by grade reduction, the cost of operating an additional train per mile will not be as great as the average cost per train mile for entire traffic over that section, and knowing the average proportion that each item of operating expense bears to the whole, the percentage of the proportion affected can be arrived at, and the percentage of cost per train mile for the additional train can be calculated. By multiplying this by twice the section mileage and by 365 and this product by the number of round-trip daily trains saved, we get the amount, which capitalized would determine whether a proposed grade reduction over that section was profitable. To find the number of freight trains saved by a reduction of grade it is necessary to ascertain the total train load that can be hauled on different grades by a given engine. This can either be done by experiment or calculation.

The foregoing shows the method followed in estimating on the grade reduction between Moose Jaw and Swift Current. Knowing the length, curvature and rise and fall on the old line, and the improvements made on the same by the change, it can be seen how these items of location affect the operating expenses, by giving the differences between these similar items their respective values.

The total angle on the old line was $1547^{\circ} 07$ minutes; on the new line $997^{\circ} 33$ minutes, a difference of $549^{\circ} 34$ minutes in favor of the new line. The rise and fall on the old line was 2246 feet and on the new line 1424 feet, a difference of 822 feet in favor of the new line. The new line is two miles shorter than the old line and the new grade is 0.4 of 1% compensated for curvature against 1% uncompensated on the old line. A capital value was given to the above items of \$6.00 per daily train per degree of angle saved; of 40 cents per foot per daily train for distance saved, and of \$35.00 per foot per train for difference in rise and fall in the old and new lines. In figuring the savings on account of reducing the grade

from 1% uncompensated to 0.4 of 1% compensated the volume of traffic was taken from statistics.

In order to show that the reduction was justifiable the following statement is given. To arrive at this it was necessary to take the improvement in operating between the years 1904 and 1905 shown on an adjoining section where the conditions are similar in order to form a comparison. The cost of hauling 1000 equivalent gross tons one mile eastbound over the Moose Jaw section in 1904, was 51.50 cents and in 1905, 40.75 cents, showing a saving due to better operating of 10.75 cents. The cost of hauling 1000 equivalent gross tons one mile eastbound over the Swift Current section in 1904, was 47.26 cents and in 1905, 28.37 cents, showing a saving of 18.89 cents due to operating and grade reduction. In 1904 the cost of hauling 1000 equivalent gross tons one mile westbound over the Moose Jaw section was 68.27 cents and in 1905 50.43 cents, showing a saving of 17.84 cents due to better operating, and the cost of hauling 1000 equivalent gross tons one mile westbound over the Swift Current section in 1904 was 76.90 cents and in 1905 42.2 cents, showing a saving of 34.7 cents, due to operating and grade reduction.

These figures give a saving due to grade reduction of 8.14 cents for eastbound traffic and of 16.84 cents for westbound traffic for 1000 equivalent gross tons hauled for one mile, and as there were 175,427,374 equivalent gross tons hauled east and 131,798,608 equivalent gross tons hauled west in 1905, the saving amounts to \$36,501.00, which capitalized 5 per cent. shows that we could have spent \$730,020.00 on grade reduction. The estimate for grade reduction was \$637,358.00. These figures show that the scheme has been a paying one, and, as the traffic increases will become more and more so.

Mr. G. Erickson.—I have given the question of grade reduction much consideration. In building the Crow's Nest the Government specified a maximum grade of one per cent. Had we been permitted to have departed from this and made grades two per cent in places we would have bunched them and by the use of pusher or assisting engines in one or two places, have hauled a much larger average train than we do. Over the two ruling grades between Crow's Nest and Macleod a 100 per cent. engine hauls 650 tons. By doubling these two grades, one of which is three miles and the other three and a half miles long, the same engine hauled 1360 tons. I figure with these grades eliminated we would save seventy dollars per train, with our present traffic over seventy five thousand dollars per annum. It would cost about one hundred thousand dollars to eliminate these two grades. The same thing to a lesser extent applies between Macleod and Lethbridge, where I estimate it would cost seventy eight thousand dollars to reduce our grades so that we would save in operation fifty thousand dollars a year.

Chairman.—Before you sit down, Mr. Erickson, I would like to have your opinion respecting virtual and momentum grades.

Mr. G. Erickson.—If curvature is slight or if line be a tangent at the bottom grades, I see nothing to object to in them. Unfortunately I have known momentum grades to be located with sharp curves at the bottom which resulted in derailing freight trains attempting to take these grades at high speed.

Mr. C. E. McPherson.—It strikes me with the grade reduction and track inspection I have heard so much about as peculiar that the speed of passenger trains has not been accelerated. Our trains are no faster today than they were four or five years ago.

Mr. A. Price.—Mr. McPherson, I take it, refers to the transcontinental trains only. It must be conceded by all that faster schedules are in force

on branch lines than were in effect three years ago. A fast passenger schedule does not necessarily follow grade revision.

I think that figures based on the formula given by Mr. Basteded will show that the grades referred to by Mr. Erickson should be reduced. We are making an improvement month by month in the cost of transportation, but this improvement cannot be continued indefinitely unless the work of reducing grades be prosecuted. This year the Medicine Hat Section is to be reduced to a 4-10 grade which will enable us to run trains through between Medicine Hat and Moose Jaw without being broken up at Swift Current as now. A great increase in the traffic along the Crows Nest seems assured and in order to avoid a congestion the grades should be revised in the near future.

Mr. G. J. Bury.—Our transcontinental trains, to which I take it, you refer, are larger and scheduled at higher speed. In fact, our transcontinental trains are the heaviest on the continent. The motive in reducing grades is not so much as to enable high passenger train speed, but rather to reduce the cost of operating freight trains. Passenger engines loaded so as to make speed required with reserve power, strange as it may seem, make better time on a rolling line than on a low grade one.

Mr. J. Brownlee.—When we revised the grades on the Swift Current section we substituted a four tenths for a one per cent. grade on which the line was originally constructed. On the Swift Current section, west-bound, we have 25 miles of four tenths grade. The water on that section is very light and the valves become dry on the engine, and, remarkable as it may seem, we could make very much better time with passenger trains on account of the prevailing grades, than we can on the present grade, although we are hauling 85 per cent. more tonnage on freight trains, and they could haul more if it were not for the water conditions above mentioned. We have increased the size of our passenger trains at least 25 per cent. over four years ago, the time to which Mr. McPherson refers.

Mr. C. E. McPherson.—But our larger engines are supposed to have greater capacity than those of four years ago.

Mr. G. Erickson.—I maintain that a passenger engine on a rolling grade makes equally as good time with 80 per cent. of the engine capacity as on a four tenths grade. With freight trains it is different as we load to the engine capacity, economical transportation rather than high speed being the *sine qua non*.

Car Inspection

BY G. H. EATON

ASSISTANT MASTER CAR BUILDER, WESTERN LINES, CANADIAN PACIFIC RAILWAY

Owing to the short time I have had at my disposal and the narrowness of the subject, my paper on Car Inspection will be brief.

The question of Car Inspection is, to my mind, a much more important position than it is generally credited with.

The attributes which go to make good car inspectors are intelligence and good judgment, both of which they are called upon daily to exercise, as a misjudgment on their part is liable to cause loss of life and property. No man should be employed in this work unless he is competent by previous experience. On the arrival of trains, a good inspector takes his position at the side of the incoming train, thus enabling him to detect flat or skidded wheels; after the train comes to a standstill he proceeds to make a thorough examination of the train, but, unfortunately for the inspector, the yard man comes along, cuts up the train and switches it to different sidings. This I consider is wrong; sufficient time should be allowed to enable inspectors to examine trains before being switched.

Locomotives should be coupled to departing trains at least twenty minutes before leaving time, thus allowing time to test and adjust air brakes.

Yardmen and inspectors should keep in close touch with each other on matters pertaining to the arrival and departure of trains, and especially in regard to cars arriving equipped with or requiring safety heaters.

Conductors of both passenger and freight trains should notify inspectors on arrival of any defects known to exist, such as skidded or flat wheels, this being a defect that is liable to be passed by the best of inspectors, should the flat happen to be covered by the brake shoe or resting on rail.

Train Parting caused by worn knuckles: This is another defect that inspectors are liable to pass, as coupler knuckles cannot be gauged unless cars are separated. Much evil results from allowing cars to run in bad condition; if cars are kept in good running order, the "stitch in time which saves nine" will prove to be true economy; even the application of a bolt or missing nut has saved hundreds of dollars worth of repairs.

When defects are allowed to accumulate by ignoring the necessity of repairs, the expense of renewal is certainly heavier. When business is dull is a good time to thoroughly repair car equipment.

By adopting the above principles, detention to trains would be avoided, shunting expense less, and inspectors would be in a better position to pronounce their trains O. K.

Organization

BY G. J. BURY

GENERAL SUPERINTENDENT CENTRAL DIVISION CANADIAN PACIFIC RAILWAY

The first organization for the purpose of joint co-operative action was formed on the Plain of Shinar. Its object was the construction of the Tower of Babel, which may fairly be regarded as a transportation project. The terminus of the proposed route was to be Heaven. Many railroad men have since cherished fond hopes of some day disembarking at the same station, but, according to popular belief, none of them has ever been able to produce the necessary transportation.

The Shinar-and-Paradise Air Line Company started out with bright prospects. Labor was cheap, material was plentiful, and the stock was readily subscribed, many of the leading financiers of the day being associated with the enterprise. There seemed every reason to expect that the new route would prove a great success, when it was suddenly discovered that the promoters had omitted the formality of taking out a charter. The authorities insisted that all construction work be immediately stopped. Such a serious blow threw the directors into confusion and panic. Their differences proved so irreconcilable that the whole project was abandoned. To-day the bonds of the company are not even listed on any Stock Exchange. The material on the ground was long since appropriated by enterprising farmers living in the vicinity.

The tendency of man to unite with his fellows for the accomplishment of any work too great for his individual capacity may be regarded as due to instinct. It manifested itself in the early dawn of the history of man, and has been treated as an axiom in every system of political economy since conceived. Its corollary must also command assent: in any combination of individuals for the achievement of an undertaking, each unit must be assigned a specific duty: there must be one to command and one to serve. Organization has many outstanding triumphs in both ancient and modern times to its credit. It built the temple of David; constructed the Sphinx and the mighty pyramids; made the Romans the greatest conquering people of history; in the person of Chatham it founded and established the British Empire; in the person of Napoleon Bonaparte it changed the color of the map of Europe in ten years; it has made the Americans the greatest of commercial peoples; it carried the C.P.R. rails around Lake Superior and through the Rockies, and it made Richard Croker a millionaire.

A railroad corporation on account of the extent of its operations and the diffusion of its energies requires a particularly flexible and adaptable organization. Railroads are vulnerable to blackmailers, to demagogues, and to hostile critics of all kinds, chiefly because their work is conducted to a large extent away from headquarters, and because the subordinate officers are not kept sufficiently informed as to the general policy which is to be pursued, and are not given sufficient leisure to keep their fingers on the pulse of trade and public opinion. Again, the possibilities of disaster through dishonesty and inefficiency are so many, that the senior officers often feel it their duty to restrict the authority of the juniors, and to indulge in criticism and a closeness of supervision

which is irritating to a high-spirited man in the ranks below. Then there are the semi-technical departments, which require on the part of officers a special training. Such officers resent the intrusion of the authority of general officers who have not had that special training, but who, on account of organizing ability and operating experience, must necessarily carry the burden of general direction.

The difference in the points of view of operating and of traffic officers is frequently a source of discord. The ambition of the traffic officer is to secure the business against all comers. The most powerful auxiliary he can have is a high-class operating service, more expensive than any competitor can afford, or considers desirable. The aim of the operating officer is to obtain the minimum service necessary to handle the business, at a maximum of efficiency, and at a minimum cost. The comparative ability of a traffic officer is estimated by heads or by tons, while that of the operating man is estimated by dollars.

Having thus explained to the best of my ability the advantages of a perfect organization, and having paid my respects to some of the peculiar difficulties which beset any organization which we have so far been able to effect on our own system, I feel emboldened to place before you a distribution of official responsibilities and duties which in my opinion would be an improvement on any which we have yet adopted.

The operating forces of a railway are usually divided into three classes: (a) those employed in maintaining the property; (b) those engaged in maintaining the rolling stock; (c) those whose duty it is to move the traffic. The problem for the railway manager is to decide at what point the three classes will merge into each other. There must, of course, be a head governing the forces, (a), (b), and (c); responsible for the results obtained for their combined efforts. On English railways the three classes merge under the control of the Chairman of the Board; on American railways, owing to their length and physical peculiarities, the unit of authority is found in the Superintendent, General Superintendent, Manager, General Manager or President.

It would be foolish to dogmatically prescribe an apportionment of authority to apply to all railways; but I consider that, generally speaking, the best results are obtained by making the Superintendent the unit of authority controlling the three classes of operating employees.

In defining the boundaries of a Superintendent's district, the great considerations should be density of traffic, and the physical condition of the road. The headquarters of the Superintendent should be as convenient as possible to the physical centre of his district. The dispatching office should be similarly located. In no case do I consider it advisable to have more than one dispatching office on a district. There should be on each district officers controlling the three branches of the service, appointed by the Superintendent, with the approval of his superiors. Such district officers should report to, and receive their instructions from the Superintendent only. On an ordinary district these officers should comprise an Assistant Superintendent, or Trainmaster; a Master Mechanic; a Resident Engineer; a Chief Train Dispatcher; a Bridge and Building Master, a Roadmaster.

Every five or six districts, according to traffic and roadbed conditions, should be grouped in a division, with a General Superintendent in control. He should be assisted by a Division Engineer, a General Master Mechanic, and a Car Service Agent.

The duties of the Division Engineer should consist of the compilation of records; a detailed semi-annual inspection of the division; the promulgation of standards (furnished by the Chief Engineer); the preparation of plans, specifications, contracts, estimates, etc. He should be a consultant for the Superintendents with respect to Engineering matters, and should assist the General Superintendent by means of his technical attainments.

The General Master Mechanic should be the General Superintendent's counsellor on mechanical matters; he should distribute power between districts; keep a check on roundhouse practice; keep himself informed as to cost of repair work, and general condition of motive power; and should frequently inspect and report to the General Superintendent on the operations of the District Master Mechanics.

The Car Service Agent should distribute cars between districts; follow all fast freight graphically; and report to the General Superintendent on all deviations from authorized car movements.

Where conditions warrant it, the General Superintendents should report to a Manager, who would have the necessary technical experts on his staff to assist him in adopting and following the best general practice, and in accepting the best standards, in order to make the system of operation as uniform as diversity of climate and traffic conditions would permit.

This plan of organization is called divisional, for the reason that by it all operating forces are controlled by one head on each operating sub-division of the railway.

It is impossible in the majority of cases to secure men for superintendencies who will be expert in all branches of operation; but the only general basis of selection must be character, experience, and executive ability. They should be assigned to the various sections according to conditions. If traffic is dense and physical conditions normal, the Superintendent should be selected primarily for his transportation ability and experience; if traffic is light and roadbed and climatic conditions out of the ordinary, the Superintendent should be chosen for his maintenance of way knowledge; if through bad water, etc., locomotive troubles are chronic on a district, the Superintendent placed there should be a man of mechanical training. This is the general line on which I have proceeded in selecting Superintendents; and while, I am sorry to say, we have not a strictly divisional organization theoretically, it is working in actual practice gradually to that end, and when the powers that be can be induced to place their seal of approval on that system, I anticipate still more satisfactory results.

There are details in connection with such a scheme of organization which hardly come within the compass of a general paper of this nature, but I may, possibly with advantage to us all, discuss one or two features which would require consideration.

If large repair shops are located on a district, they should not be under control of the District Master Mechanic, but of a Works Superintendent reporting to the General Master Mechanic. The main manufacturing shops of a system should be in charge of a Works Manager, reporting to the Superintendent of Motive Power. General Master Mechanics should have inspectors in the large repair shops who would specify what work was to be done on locomotives in for repairs, and who would see that the stipulated work was satisfactorily done.

Large works of improvement or construction, involving contracts, which it might be deemed inadvisable to leave to the district forces, who are usually fully occupied with other work, might be placed directly under the Division Engineer, but in the general operation of a district he should have no commanding voice.

In locating district officers, it is preferable to assign them to districts as far as possible removed from those on which they have served their apprenticeship. The time worn adaptation of the scriptures which says that "no man is a prophet in his own country" is but too true, as far as railway officers are concerned. Officers placed in charge of large bodies of men should have magnetism and forceful personalities. Such faculties are born in a man's system, and cannot be acquired, or artificially stimulated or injected. The man born to command can maintain strict discipline, and yet command the general good will of his subordinates.

Nothing should be left undone to develop *esprit de corps*, and to build up a sense of proprietorship in every employee. The men should be encouraged to make suggestions, and frequent conferences, or cabinet meetings of district officers should be held, to which it might be advisable to invite a few employees of good standing, and with influence among their fellows. Such men would doubtless be gratified to find the confidence reposed in them and the respect in which they are held by the other men would prove a valuable asset to the Company in the effort to bring its interests and its policies closer to the sympathies of the mass of employees.

Railway officers frequently assume the functions of coroners, and spend valuable time in holding post mortem investigations on the same old skeleton day in and day out, without ever drawing any practical lessons from the findings. Nagging, short grained letters written on *ex parte* evidence, cannot possibly accomplish anything. Nothing weakens an organization as much as to enmesh the district officers in red tape, or to frown on any evidence of initiative. Rather should they be instructed in the policy of the Company, counselled when necessary, and given latitude on broad lines to accomplish what is expected of them. A system as uniform as is possible in a world which is always in evolution can be built up, and at the same time the individuality and initiative of the officers be preserved to the great advantage of the Corporation.

It may be contended that this is an age of specialization and that departmental chiefs should have full swing. No man can dispute that it is necessary to have technical trained men in railway service, but the benefits of their special experience and knowledge can be diffused without placing operating forces under their control. When a strictly departmental system is followed, it will be found that some departments invariably make a favorable showing at the expense of another. In thus advocating the divisional organization, I am constrained solely by the fact that it is the co-operation of all operating forces under one head on an operating district, which will most effectually contribute to efficiency at the lowest possible expenditure of money.

Mr. J. E. Schwitzer—In connection with this able paper of Mr. Bury's there is not much that can be said, as it pretty well covers the ground. There are several points, however, in which I differ slightly from him in the details of the organization. It is very much to be regretted that in the examples of the early organization that this has been brought forward at all. For example, take the reference to the tower of Babel. It was evidently a Departmental organization, but was changed somewhat suddenly to a Divisional organization, when the whole project failed.

In connection with Napoleon; while he changed the map of Europe, I think if he had stuck to the Departmental organization more than he did the heads of his Departments would have foreseen the causes of downfall, such as the burning of Moscow and not having had sufficient commissaries to take care of his troops on the return, and would have provided against the same. Had it not been for this we would probably all have been French subjects to-day.

I differ altogether from Mr. Bury in connection with the district officers controlling wholly the different branches of the service. For instance, he has suggested that all the heads of the different sub-divisions should be appointed by the Superintendents. This I do not think is right, for a Superintendent should not be the judge of an engineer's ability. While it is absolutely necessary that an engineer should consult and report in all ordinary matters to the Superintendent, as far as engineering is concerned I think he should report to the Divisional Engineer. The same thing applies to the Mechanical Department.

As to the duties of the Divisional Engineer, he should report on all ordinary matters and keep the General Superintendent posted on matters of Engineering, but he should also report to the Chief Engineer or the

next official in the Engineering Department ahead of him, as to the material, the work that is to be done and the cost of same. He should also have a voice in saying when the work should be done, and also as to the manner in which the work should be carried out. All matters of organization, the same as the movement of traffic, should be in a forward direction. Mr. Bury carries this out in his paper until he gets to the heads of the departments. The General Superintendent reports to the next official ahead of him; whether he is the Second Vice President or Third Vice President, is immaterial. On the General Manager's staff he recommends that there be three experts in connection with each of the different branches of the service. This means that any matter that is referred direct to the head is to be referred back again to these experts in order to get their opinion on it. This is a retrograde movement.

I think that he has inadvertently omitted in the paper that in bad water districts, the Superintendent should be a man of mechanical or engineering training. With the poor, responsible Engineer there is no hope, he is stuck there forever as an Engineer. When large works are to be carried out, the Divisional Engineer should have a voice in the same; it is impossible for him to carry out large works unless he has control of the manner in which the same are to be done.

Mr. F. W. Peters—There are some remarks made in Mr. Bury's paper with which I do not agree. There is one clause on the second page which reads—"The difference in the points of view of operating and traffic officers is frequently a source of discord." He did not mean discord, because we do not know that word, but it is frequently a source of controversy and it always will be until our operating officers realize the necessity of giving a service that is equal to our competitors. If they think we are going to keep quiet and say nothing, they are living in a fool's paradise. We want a service to handle the traffic that is equal to our competitors' and we do not want one that is more than equal. He goes on to state that the most powerful auxiliary that the traffic officer can have is a high class operating service, more expensive than any competitor can afford or considers advisable. Now, Mr. Bury has no right to assume that the service we ask for is more expensive than our competitor needs or that our competitor considers advisable. If therefore, we should, in our desire to get all the traffic we can, claim a service that is better than our competitors then we are unreasonable and are not entitled to it. The traffic officer who requires a better service than his competitor gives in order to secure business is weak himself and he ought to be superannuated. The trouble is here that sometimes our operating officers, in their desire to make a good record in the cost of operating the divisions, hate to believe that our competitor is giving as good service as he does. No one is so blind as the chap who will not see. He will not admit that his competitor is giving equal service and it is that difficulty we meet. I meet it frequently. These officers will not admit that our service is inferior in any respect, and so long as they take that view, it is most difficult to get them to improve. Mr. Bury says the aim of the operating officer is to maintain the minimum service necessary to handle the business at a maximum efficiency at a minimum cost. The trouble is that too much importance is attached to the matter of cost, simply the expense involved in the transportation of this freight, but our officers should not forget that this is only a small item in the cost of running a railway, for half the cost of the railway is in the direction that is not shown at all, or perhaps, very frequently forgotten, for half of it is a fixed charge in which the movement of freight cuts no figure whatever; it does not lessen it in the slightest degree and I think that it is very often forgotten and it is supposed that the whole expense of the Company consists in the cost of moving that train over a division.

As I have said the object of the operating officers is to maintain a

record for economy in the handling of the division, but there is a danger of that resulting sometimes in injury to the service and the loss of business and this is what we traffic officers are trying to secure and unless the service is maintained, as I said, equal to our competitors, we cannot hold the business.

Mr. W. Cross—I did not mean to speak on this subject as it is an involved subject, a very involved subject.

Mr. Schwitzer has spoken in connection with the technical part of the business. The operating man desiring to give the best effect and obtain the best results will respect the Technical Department all the time, he will never neglect it. On the other hand, the Technical Department will say to the operating "We build up the system and under certain circumstances it is entirely yours; we have no desire, not the smallest desire, to interfere. It is right up to you now, do what you can with it and get all you can out of it, but bear in mind that we created it and we must be respected."

Mr. F. F. Busted—I think Mr. Schwitzer has dealt fully with this paper of Mr. Bury's in regard to the standpoint of the Engineering Department, and I agree with what he said in regard to the appointment of Resident Engineers by the Superintendents. Of course it may be said that the Superintendents may be chosen from the Engineering Department, and to follow Mr. Bury's paper, of course there are certain districts where the conditions are such that the Superintendent could select Resident Engineers from his own knowledge, but I think the Engineering Department should select the engineers from the knowledge that they would have of the man and what is required of him.

Mr. J. Brownlee—While the Engineering Department do not say it in so many words, we infer that the gentlemen who have spoken believe that the Superintendent ordinarily appointed who is not an engineer, is not capable of taking charge of the work which properly belongs to the Engineering Department. That may be quite true, but at the same time we should remember that the President of this road is not an engineer either, and all men employed on the road, no matter what their occupations may be, are responsible to the President, who is really the fountain head. From what is said, I do not see why anyone should have the idea that an engineer cannot be appointed a Superintendent, and it must be gratifying to everybody to know that the Canadian Pacific Railway Company have got out of the rut of selecting men to fill this position from only one or two branches of the service.

If a Superintendent is not in charge of everybody on his Division, his title should be changed. I do not for one moment think that I could choose a Resident Engineer for my district unless I had some experience with him, but Mr. Bury's idea, as I understand it, is that appointments will be approved by the heads of the various Departments.

As the Superintendent is responsible for the money expended on his district, and the revenue derived from that district, he should also be responsible for the men employed to work on the district. If he is not competent to do this, the Company should replace him. So long, however, as he is held responsible for the expenditure, he should be given absolute control.

Mr. S. J. Hungerford—I would like to mention one point which has not been brought out to-day. I am sure when I mention it the gentlemen will be ready to discuss the question of clearly defining each one's official duties.

Mr. R. R. Jamieson,—“It may be remembered in years past, in fact at the early inception of the C.P.R., that we had somewhat of the Depart-

mental system and we found that it did not work. For instance, the Engineering Department had charge of certain work, and the operations in connection with that work did not fit in with the requirements of the traffic. As one speaker has said, we are a transportation company, and everything must be carried out with a view to the handling of traffic satisfactorily. We found so much difficulty in one Department working with the other that we were not able to carry on our transportation satisfactorily and do the work that the other Department had in mind, and for the doing of which they were responsible. Therefore it was a natural drift into the position in which we are to-day along the line of Divisional organization, and that we will drift into a more pronounced and distinctive organization on Divisional lines seems to me the natural trend. We are in the transition stage to a more perfect Divisional organization."

Mr. O. O. Winter—I wish to say this is, in my opinion, the most important subject on the programme, and that the views expressed upon it by Mr. Bury are in line with the opinions of many of the ablest operating officials on the Continent. It has been my good fortune to have always heretofore worked under a strictly divisional organization. The fact that our business is handled so well under our present organization is due to the character of the men who are at the heads of the Engineering and Mechanical Departments. Even then, with most competent heads, it at times takes a divisional officer a long time to secure changes in staff, that, from his daily observation, are known to be absolutely necessary and in the interests of the service.

Mr. A. Price—I am in accord with the Divisional Organization advocated by Mr. Bury, although I may be looked upon as a recent convert to that view.

There is no reason I know of, why a Superintendent possessing the necessary qualifications, no matter from what Department he has gained his experience, should not be able to handle the various departments under him. As Mr. Brownlee says, the Superintendent is the man who has to explain why things do not go as they should, and I submit, therefore, that the man who is responsible for expenditures and results should have the command of the men who spend the money and produce the results. The Superintendent would, of course, when appointing a Resident Engineer or a Master Mechanic, confer with the Engineering or Mechanical Head with a view to securing a man with the necessary technical knowledge to fill such a position.

Mr. H. E. Beasley—I should like to say that on the Pacific Division we have practically the same organization as Mr. Bury suggests, that is, we get the same results. It would be a very difficult matter for us to work independently of each other, but it seems to me that we are working in line with Mr. Bury's paper. I quite agree with this general plan, viz., that the Superintendent should control the whole of the operating staff, just as soon as the traffic will warrant from an economical standpoint the centralization of the mechanical and other departments under one district.

Mr. G. Forde—I might mention a system in effect on one of the southern lines. There they take a young man, say an engineer or a train dispatcher, whom they think would make a good Superintendent, and place him in a "School of Instruction" employing him for a short time in each Department. It may take from one to three years, according to the man's ability, and while he is there they pay him the salary he was drawing previous to entering the "School." In this way he receives a general idea of the run of the work, and is given a foundation on which to build up the requisite knowledge of the work of each Department. This enables him to take up the work of any branch

of the service when he receives the appointment of Superintendent. Such a system, I think might be found beneficial to the C.P.R.

Mr. T. Kilpatrick—I am in accord with a great deal of what is said by Mr. Bury in his paper. A great deal of discussion has taken place as to the control the Superintendents should have on their respective districts. What is of great importance is unity between the different heads of the departments. Whether the organization is departmental or divisional, the Superintendent can do a great deal to bring the different officers into harmony. It is well known to us that we are not able to go into the technical details of all the different departments and the line to draw, therefore, is a difficult one.

Mr. Frank Lee—I think from what has been said that the opinion of this meeting is rather in favor of Divisional Organization over that of the Departmental. We all seem to be pretty well of that opinion, the difference being generally whether we are ready for it now or whether we had better wait until later.

As regards the relation of the engineering Department to the Division. Inasmuch as technical superintendence is necessary for the proper operation of the railroad and is an essential portion of any organization, it would seem almost necessary that the engineering or the technical head should be in touch with any work which concerns his special line. The various railroads in the States have dwelt on this subject for a very long time, and the experience of one of the railroads recently seems to have shown that it is very much uncertain as to which is the better system. I speak of the Rock Island, which first abolished the Divisional Organization and adopted the Departmental, and in about a year and a half abolished that and adopted the Divisional again. It seems to me that no matter what organization is adopted, the personality of the man is the really important feature, and whatever type of organization is adopted it will have to vary and adjust itself to the capabilities of the various individuals in office.

Chairman—I think this is a most important subject, because without proper organization it will be impossible to carry on the affairs of the Company and the larger the affairs, the more necessary to have specific organization. Of course the development has been very great in the last few years on the Canadian Pacific System, and whether the system suggested by Mr. Bury would be the best for a railroad that is developing and building and doing so much betterment work is a question. I think that on a line that is completed, where there is not so much new work to be done in the way of new lines and betterment, the Department System is by long odds the best.

I think with our present organization and the men before me now (I am not throwing bouquets) that we should take second place to no company for the efficient organization so far as the heads of the different departments are concerned, both as regards intelligence, knowledge and capability.

The more you can concentrate the work, the more efficient and economical the work; if you have it disarranged, it will cost more and take longer to reach the head.

Water Treatment

BY W. CROSS

ASSISTANT TO THE SECOND VICE-PRESIDENT, CANADIAN PACIFIC RAILWAY

Water has ordinarily come to us so cheaply and in most localities so abundantly that its merits and demerits have not always been closely analysed.

I assume that the treatment that must now be looked into, is as it affects Railroad purposes and as the chief of these purposes is that which is required for locomotive uses, the subject will be considered from that point of view.

The kinds of water available for such purposes may be classified as follows:

1st. The rivers and streams that drain the territory through which the Railways pass; 2nd, the springs; 3rd, the wells; 4th, the rain and snow falls.

I have enumerated these in the order of their advantage and generally of their purity. It goes without saying that wherever the water of a river or stream is available and is of abundance, that it will be used. It unfortunately happens, however, that if such be distant from the place of requirement, and another supply is more easily obtainable it is taken and thus the foundation is laid for those variations in the motive power which are so perplexing to the operating department. If such a supply happens to be a spring, it will ordinarily, if not in a prairie country, be quite as acceptable as the river or stream, and will only be questionable by its capacity, but if in a prairie country, it must be tested and analysed and probably the outcome will be to the engineer seeking good water as delusive as though none had been obtained.

The same will apply to the wells with the difference that wells are not to be trusted in any section of the country whether considered as to their quality or capacity and, therefore, no water supply for steam purposes should ever be organized from such sources without thoroughly testing and proving beyond a shadow of a doubt that the water obtained from them will be sufficiently pure and plentiful to pay for the investment necessary to obtain it.

The question may be raised as to what is a fair and proper criterion of good water and also of what may be considered water improper to use for

boiler purposes? To answer such a question, the experience gained upon this road may be considered reliable and I will compare a few of the waters which are considered good. Thus we have in the vicinity of Winnipeg, a water which is called good by all who use it and yet which carries 37.17 grains of solid matter to the gallon and out of these, 30.7 are scale forming. We have had at Winnipeg (that now used is better) a water carrying 79.46 grains to the gallon out of which 30.6 were scale forming. This water was called bad by all concerned and it was bad undoubtedly. In order to show why these two waters should bear such a different reputation, I give in full the analysis of them and also a few other supplies which I shall refer to:—

	Na. Cl.	Na. 2 So. 4	Mg. 2 So. 4	Mg. 2 Co 3	Ca. So. 4	Ca. Co. 3	Total Solids	Scale Form- ing	Non- Scale Form'g
Rennie	0.1			1.4	1.3	2.5	5.30	5.20	.10
Winnipeg	28.93	19.92	.70	13.58	1.68	14.65	79.46	30.61	48.85
Rosser84	5.57		18.60	1.24	10.92	37.17	30.72	6.41
Moosomin	7.60	18.90		18.80	37.10	7.70	100.10	63.80	36.30
Wolseley	2.07	20.88	17.63	15.08	24.98		80.64	40.06	40.58
Antelope21	26.31		14.84	15.18	3.91	60.45	33.93	26.52
Field		5.07		4.99		3.92	13.98	8.91	5.07
Total Solids							357.10	213.03	154.13
Average							52.45	30.43	22.2

The seven supplies as given here may be taken as a fair average of the waters which have to be used up to this date for locomotive purposes on Western Lines. The two supplies which I have referred to, Winnipeg as it was and Rosser as it is, the one called and known to be bad, and the other called good and yet by analysis, the bad water shows less scale forming constituents than that which is called good: why is this? Rennie, you will notice, also called good, shows only 5.3 grains to the gallon all of which except .10 is scale forming. This water is a fair sample of what prevails from there to Fort William and we, therefore, have east of that place water positively good and thus we find that all sections are relatively good or bad according to the supplies which can be obtained, and it is for the officer (I should say Engineer) in charge of the water system to analyse and compare and arrange in such a way that the supplies of each section shall be developed and systemized so that the best results from the use of such waters may be obtained.

The question I have raised in connection with the two waters, Winnipeg and Rosser, which I have set up as examples of what may be called bad and good by those who use them and which by analysis show that the smallness of the scale forming constituents is in favor of that called bad, has caused me to total the seven supplies set up and from the total I find there 154.1 grains of solids which are set on one side and not treated by re-agents. I presume that this point being one which affects greatly the motive power is worth considering in every way. These 154 grains exist and being solid and not water at all, are injurious, and in this consideration they must be studied and such suggestions offered as will enable us to meet the evils of them. It is allowed that the scale forming matter can be treated chemically. Our present system does that; that is those constituents are rendered soluble by the admixture of Caustic Soda and lime but so far beyond this we have not progressed very much and also so far we have not succeeded after precipitating such, in separating them from the water treated, therefore, the progress made so far has been to render the scale-forming constituents non-scale forming, and thus they add to the 154 grains and the whole must be ejected from the boilers by a pro-

cess of blowing off, changing waters frequently, and washing out. As the perfecting of the system and plant for ejecting this scale forming matter, after it has been precipitated, is under consideration and as it is one of those things which can be accomplished by the aid of money, I will leave this part of the subject to the Engineer and Chemist and pursue the 154 grains in order to see what can be done to avoid or get rid of them. You will remember that this is the matter which caused the Winnipeg water to be known positively as bad when compared with Rosser, although Rosser had a larger quantity of scale forming matter in it and as it deserved the character and all such deserve such a character, I shall consider how we may avoid or get rid of such. You have noticed that the Rennie supply is almost devoid of the constituents which are so bad in the waters called bad, and which cannot be eliminated by chemicals, and from that we are led to deduce that it is our first duty to endeavor to get supplies of that description. Take the natural supplies as set up on a previous page. I find that it is only the first and last, viz:—the rivers and streams, and the rainfall which can be depended upon to meet the obligation, the others and even these, must be subjected to test in order to prove them satisfactory. It becomes, therefore, a matter of calculation as to whether the river supplies are within such a distance as will pay the Company to procure them, and it also is a matter of calculation as to whether the precipitation in the way of rainfall can be stored reliably in those locations where there are neither rivers, springs, nor well supplies available.

The average rainfall in the year 1901 was 12.18 inches in the neighborhood of the C. P. R. west of Moose Jaw and the snow fall 42.5 inches giving a total of 18.7 inches of water. If, therefore, upon our main line, we consider that a daily supply of 50,000 gallons per water tank is necessary, it is further necessary to consider the storage capacity of the reservoir required and also the area to receive the precipitation. The average being 1½ inches per month, the basis of storage to be safe should not be less than one year's supply, viz:—18,250,000 gallons. Good authorities place the evaporation and filtration of water stored in this way as equal to 1½ inches per day and we, therefore, at the very outset are compelled to reduce the storage area to the smallest reasonable unit. To meet such a demand, therefore, I estimate that one hundred and fifty acres averaging a depth of fifteen feet would not be too much to put us upon a secure footing for reservoir capacity and ten times that at least to receive the precipitation. Whether such a location or locations can be obtained, and whether the cost would be a profitable investment is for consideration according to the circumstances.

Assuming that the expense is beyond the possibility of a profitable return the consideration must proceed to the next practicable method of obtaining water for the traffic, and to illustrate this I will set up two sections of our system which give us a great amount of trouble to our power and interrupt the traffic thereby, these are the Broadview and Moose Jaw sections.

	Mile- age	Na. C 1	Na. 2 So. 4	Na. 2 Co. 3	Mg. 2 So. 4	Mg. 2 Co. 3	Mg. C 1	Ca. Co. 3	Ca. So. 4	Ca. C 1	Total Solids	Scale Forming	Non- Scale Forming	
Brandon		2.4	12.9			13.5		9.7	12.4		50.9	35.6	15.3	
Trenouth	13.8	9.9	6.1	1.9		4.4		13.3			35.6	17.7	17.9	
*Oak Lake	18.4	1.7				5.5		14.4	2.1		27.2	23.0	4.2	
Virden	15.3						8.0	19.6	13.3	2.3	43.2	32.9	10.3	
Elkhorn	16.6	2.1	2.4			3.6		11.8	3.0		22.9	18.4	4.5	
Fleming	22.6													
Mosomin		7.6	18.9			18.8		7.7	37.1		90.1	63.6	26.5	
Wapella	16.1	0.3	3.0			14.1		14.7	17.1		49.2	45.9	3.3	
Whitew'd	14.1	5.7	34.8		19.5	23.4			57.2		140.6	80.6	60.0	
Broadview	14.6	2.1	22.3	9.9		0.8		19.0			54.1	19.8	34.3	
	131.5										57.1	37.5	19.6	
Averages														

* Contains 3.2 grains of other matter not enumerated.

Taking the Broadview section first, I find that the total solids in the water average 57.1 grains of solid matter of which 37.5 are scale forming and 19.6 are non-scale forming but which must be dealt with all the same.

Commencing with the Brandon water, we have first the characteristic of abundance and, therefore, we can safely engineer in connection with it in that respect upon a solid basis. Having done so you will observe that its constituents are simply what the chemist and a proper mechanical appliance can deal with to supply what we may fairly call good water. The next three tanks are also within the management of the Chemist and we next get Virden which is 47.5 miles from Brandon. It is purely an engineering proposition in this vicinity as to the abundance of water as the Assiniboine River parallels the Railway and in case that Virden, as at present, cannot be relied upon as an abundant supply, that can be held in reserve. Assuming however, that Virden, as shown upon this list, can be relied upon, it is simply a chemical proposition to obtain good water at this place and it follows as a mechanical proposition that the engines upon the Broadview section shall be fitted with tenders which will enable them to run from Brandon to Virden.

Taking the engines of 150 per cent capacity as the standard which will equip this section in the near future, I find that the tender's capacity required will be 7,000 gallons. The ordinary water capacity of a tender for such an engine is 5000, such tenders, therefore, exceed that by 2000 gallons, or in other words 18,000 lbs. weight, which will be that much dead weight carried per trip to accomplish a certain object. The exact cost for moving lead freight is 40 cents per 1000 ton mile, therefore, this amount 47.5 cents per trip would stand against operating charges. After Virden comes Elkhorn with water that will be good when properly treated chemically. The mileage to it from Brandon is 64.1 which will bring it within the sphere of the operation of such engines by aid from Oak Lake. After Elkhorn is Moosomin, which as soon as Virden is made reliable, should be abolished. After Moosomin is Wapella 55.3 miles from Virden and 38.7 from Elkhorn. This tank when chemically treated will give the best water on the section. After Wapella is Whitewood with 140.6 grains of solid matter to the gallon, 70 of which cannot be treated chemically with success, so that it should be abolished, and then Broadview the end of the section, 28.7 miles from Wapella and 67.4 miles from Elkhorn to which all through freights would run on eastbound trips if fitted with tenders as specified herein. The Broadview water is bad but being at Broadview, a Divisional Point, it must be tolerated and its evils will be best considered in connection with the waters used upon the Moose Jaw section, as the Broadview section engines will mitigate it very much by filling up at Wapella from which place into Broadview very little more than half of their tender capacity will be used.

The water supply upon the Broadview section treated in this method would show as follows:

	Scale forming parts.	Non-scale forming.
1st Brandon with	35.6	15.3
2nd Oak Lake	23.0	4.2
3rd Elkhorn	18.4	4.5
4th Wapella	45.0	3.3
	<hr/>	<hr/>
	122.0	27.3
Average	30.7	6.8

Allowing that only 75 per cent. of the scale forming matter is removed the result of the above arrangement gives a water for use containing 7.6 of scale forming matter and 6.8 of non-scale forming matter as against

an average of 37.5 and 19.6 as at present. The ten water supplies on the Moose Jaw section shown as follows:

	Mile- age	Na. Cl	Na. 2 So. 4	Na. 2 Co. 3	Mg. 2 So. 4	Mg. 2 Co. 3	Mg. Cl	Ca. Co. 3	Ca So. 4	Ca Cl 2	Total Solids	Scale Forming	Non- Scale Forming
Broadview		2.1	22.3	9.9		0.8							
Ingram	20.6	5.3	25.8			11.2		19.0			54.1	19.8	34.3
Wolseley	10.6	2.05	20.88			15.08		14.0	27.6		85.9	52.8	33.1
Shualuta	9.1	10.6	16.9		17.63				24.98		80.64	10.06	40.1
Indian Hd	9.3	0.11				14.1		13.3	39.0		83.9	66.4	17.5
Lillis	15.1	0.6	5.0			5.81		8.82	2.51		15.28	15.17	.1
Perry	17.0	0.1	3.1			12.9		9.7	22.8		51.0	45.4	5.6
Regina	9.2	3.8	20.9			4.1		14.0	1.9		23.2	20.0	3.2
Spring Rice	12.2	2.4	2.6	0.7				5.0	2.1		42.6	17.9	24.7
Moose Jaw	29.5	0.21	26.31			5.9		14.7			26.3	20.6	5.7
Average						14.84		3.91	15.18		60.45	33.93	26.52
											52.5	33.4	19.1

It being understood by all who have to manage the power connected with these sections, that the Moose Jaw section gives the most trouble, that is to the traffic, the showing of the averages of the constituents will be considered remarkable as they show less in all particulars than the Broadview section, but when you consider that upon the westbound trip on the Moose Jaw section the salts in the water supplies for the first 50 miles average for Sodium Chlorides 2.5 and Sodium Sulphates 21.9 as compared with 3.8 and 8.6 upon the Broadview section in the same distance the matter is explained. It is these salts which are so difficult to remove and which cause foaming so badly and consequently a very imperfect operation of the motive power, as water passing through the cylinders when high speeds are necessary is a positive obstacle, beside being dangerous to cylinders and very detrimental to the operation of the boiler. To remedy this upon the Moose Jaw section is a very important matter. The Broadview water you will notice carries 34.3 grains of these injurious element to the gallon and it being the commencement of the run and the next supply carrying 33 and the one beyond that 40, makes the prospect dark indeed but not hopeless. Whereas it has been shown that upon the Broadview section a great improvement can be obtained by chemical precipitation and enlarging tenders, it remains to be seen what can be obtained by treating the Broadview and Wolseley waters in the same way and by filtration in addition. If the supplies at these two places are of sufficient abundance to warrant the expense these remedies should be applied, they should be applied any way in the natural order of maintaining the business as they have so far proved to be the most reliable supplies in this district, but if they can be relied upon to meet the demand without the aid of Ingram, that supply should be abolished. At 49.6 miles west of Broadview is a water, Indian Head, which if obtainable in abundance, will almost pay at any price to get and establish. With its aid and Broadview assured as a plentiful supply the Moose Jaw section can be transformed into one of our best sections as it will pay to distil the water at Broadview and use tenders large enough to ensure the run to Indian Head thus establishing a good water start. From Indian Head to Perry a distance of 34.1 miles, another supply of good water prevails, that is water which can be made good by chemical treatment but it is probable that the storage capacity will require to be enlarged to meet the growing demands. From Perry to Spring Rice, 21.4 miles, another supply of good water exists, but it also may require engineering improvements to enable it to meet the demands. From thence to Moose Jaw 29.5 miles and the trip is over, but the consideration exists for the improvement of it. It should be put upon the same basis as is suggested for the Broadview water, viz.—

precipitation. The improvement of this section on the lines suggested using the same capacity tender as suggested for the Broadview section, would give an average water containing 19.4 of scale forming solids and 10.8 of non-scale forming. By precipitation and separation of the first they would reduce to 5 grains per gallon and this district instead of being notoriously bad, would become comparatively good and the work of the power would be in accordance with the improvement.

In my list of standards I show Antelope which is on the Medicine Hat section. It shows at a glance as bad water and it affects westbound trips on that section as Wolseley does on the Moose Jaw. With the improvement suggested both tanks would be unnecessary and their evils avoided. I also show Field which is in the mountains and where pure water might be looked for but as it is not pure this showing will correct the idea and enforce the fact that all waters for boiler purposes must be tested analytically before being accepted as good. It was from the fact of the lime in this water attacking the crown sheets of the boilers located here that we awoke to the fact that this mountain water was not as good as it should be.

It is worth while at this stage to consider the saving of expense which may be estimated by considering the staff as it exists upon the districts affected by the alkali water and those not. Thus take Fort William as representing the staff that can handle power of the heaviest class making 3000 engine miles per month on a good water section, I find it to be \$120.00 or in other words the washing out costs \$3.00 per boiler per month. Winnipeg is a fairly representative station for the alkali district and the cost of the staff averages 834.39 per month or \$9.00 per locomotive. The saving, therefore, to be attained is \$6.00 per engine beside a reduction of 50 per cent. in the time that the engines have to be held for washing out purposes and the saving of the time held is not all by any means. The average mileage of engines in good water districts is always greater than in bad and the service they give is better, less trouble exists on the road in handling the traffic and thus more satisfaction is given to the operating department. In addition there is the lengthened life of the fireboxes and tubes between repairs. At the very least this will be doubled and thus boiler repairs will be reduced about one half.

The head of the Mechanical Department on one of the large roads to the south of us has lately put himself on record as attributing one half of the engine failures which occur to boiler troubles. With us these troubles come down very largely to bad water troubles and to exemplify this I must refer to a traffic statement compiled for the Central Division for four days covering a period of cold weather which prevailed from December 27th to the 30th inclusive. The total of the failures therein enumerated was 62, and out of these 27 were boiler failures, so that in this experience they represent 44 per cent., but the fact I wish to impress at this time is tube or fire box leakage. The statement showed a clean sheet for district 1, but upon the other three districts the record piled up until it showed 30 per cent. of the whole. District 1 used to be notorious upon one section for this kind of trouble. Very little change in our methods has taken place to effect the improvement, except to wash out with good water instead of bad, and as a natural result fill the boiler with the best water we have after its washing out instead of with bad water. This was, of course, very simple but it has had a good effect toward the improvement as shown above. Outside of this I know of nothing except the kind of water used, that will explain the difference in the boiler troubles east and west of Winnipeg as shown in this case. Certain I am that more official attention is paid to the care of engines on districts 2, 3 and 4 than on No. 1 and yet the result is as mentioned and which was brought into prominence by a drop in the temperature, thus putting a little harder work upon the engines.

A part of the remedy I have suggested entails larger tenders. It is so easy for traffic managers to move power from one district to another

without considering the attributes of the power, except, may be, the percentage, and possibly how some engineer likes one engine better than another, that I do not see very well how this improvement is to be obtained unless the following regulations be observed;—

- 1st. Operate the locomotive as a machine in itself and the tender similarly.
- 2nd. Arrange a system of numbering to suit such operating.
- 3rd. Design and build engines and tenders so that they will be interchangeable but maintaining the qualifications for passenger and freight as required.
- 4th. Failing to be able to attain the above, observe the standards as established upon sections and maintain them until imperative changes of traffic calls for changes.

There is just one other feature in connection with the subject that I wish to mention and that is the circulation of the water in the boiler. To go to heavy expense purifying water and not consider this part of the subject would not do it justice. The study of the best boiler for locomotive purposes and to meet the growing dimensions of power, is occupying, very largely, the minds of the mechanical designers. Even the simple advance of increasing the boiler pressure has been a means of increasing boiler troubles, as at lower pressures the evils of alkalies are latent; it is the higher pressures which have exposed them. The change of design to the shallow firebox was also a move to expose the troubles from these alkalies, as also it exposed the human liability on the part of the fireman to error, the difficulty of keeping covered all the large grate area to be fired being relatively greater. The writer I have referred to, following in the line of design which the prairie engines have established in the direction of a deeper firebox, has suggested a revival of an old design along with such boilers, viz.—the combustion chamber. By this he shortens the tubes and removes the suspicion of sagging when in service and also gets his tubes further away from the intense heat of the firebox. This should and will reduce tube leakage and improve the circulation. I am desirous of going further. Theoretically it may safely be said that firebox troubles, even in the bad water districts, would be almost entirely cured if the water before reaching the firebox was of the same temperature as that which surrounded it. The immediate benefit would be, first, the deposit of the alkalies before the water reached the place of evaporation, second, the avoidance of the troubles incidental to contraction and expansion. While it may be said that such perfection is almost unattainable, still it may also be said that to attain such should be a standard to aim at in order to obtain the best results. I find, taking the large engines lately built for this Company, that in those of the last four year's design, that the place of discharge of the feed water into the boilers is as follows:—1300 class with 48 per cent. of the water capacity of the boiler above the discharge and of the 700 class of 45 per cent. The temperature of the water entering these boilers is 280 degrees, while that inside of the boilers is 387 degrees and thus a difference of 107 degrees of temperature is met inside of the boiler just as soon as it enters. Now what is the result of this? If I put a diagram before you which will show an ordinary locomotive boiler and you will note the sides and crown of the firebox, wherein is erected the heat which causes evaporation, you will find relatively that upon the sides and crown 95 5 per cent. of the surface is covered by water while on the tube sheet there is but 73 per cent., it will indicate the direction of the current of feed water from the inlet into the boiler direct to the place of highest evaporation. The idea, therefore, of a combustion chamber to lessen this heat upon the tubes is a good one but it is only one step in the necessary direction. Assuming that upon the two classes of engines which I have referred to, the application of the heat is equal (as a matter of

fact, it is greater upon the tube sheet) the fact that there is 22.5 per cent less water to sustain the evaporation, shows how necessary it is that the current of water which maintains that evaporation should be heated to the full boiler temperature before reaching that place. How shall this be accomplished? Drawing 6403, which accompanies this paper, shows a plan for feeding water into boilers which will overcome the evil I have pointed out. Instead of feeding near the center line of the water capacity as the designs at present call for, it passes through chambers situated above the water line from them and is discharged into the boiler at the top level and as remote from the highest evaporative points as possible. The improvements to be gained by the design may be summed up as follows:

- 1st. The deposit of those alkalis which I have shown must be treated otherwise than chemically.
- 2nd. The blowing off as such as an independent operation.
- 3rd. The improved blowing off as such alkalis accumulate near the surface and form scum.
- 4th. The heating of the feed water before it enters the water in the boiler.
- 5th. The improvement of the circulation by preventing the cold current which prevails under present designs.

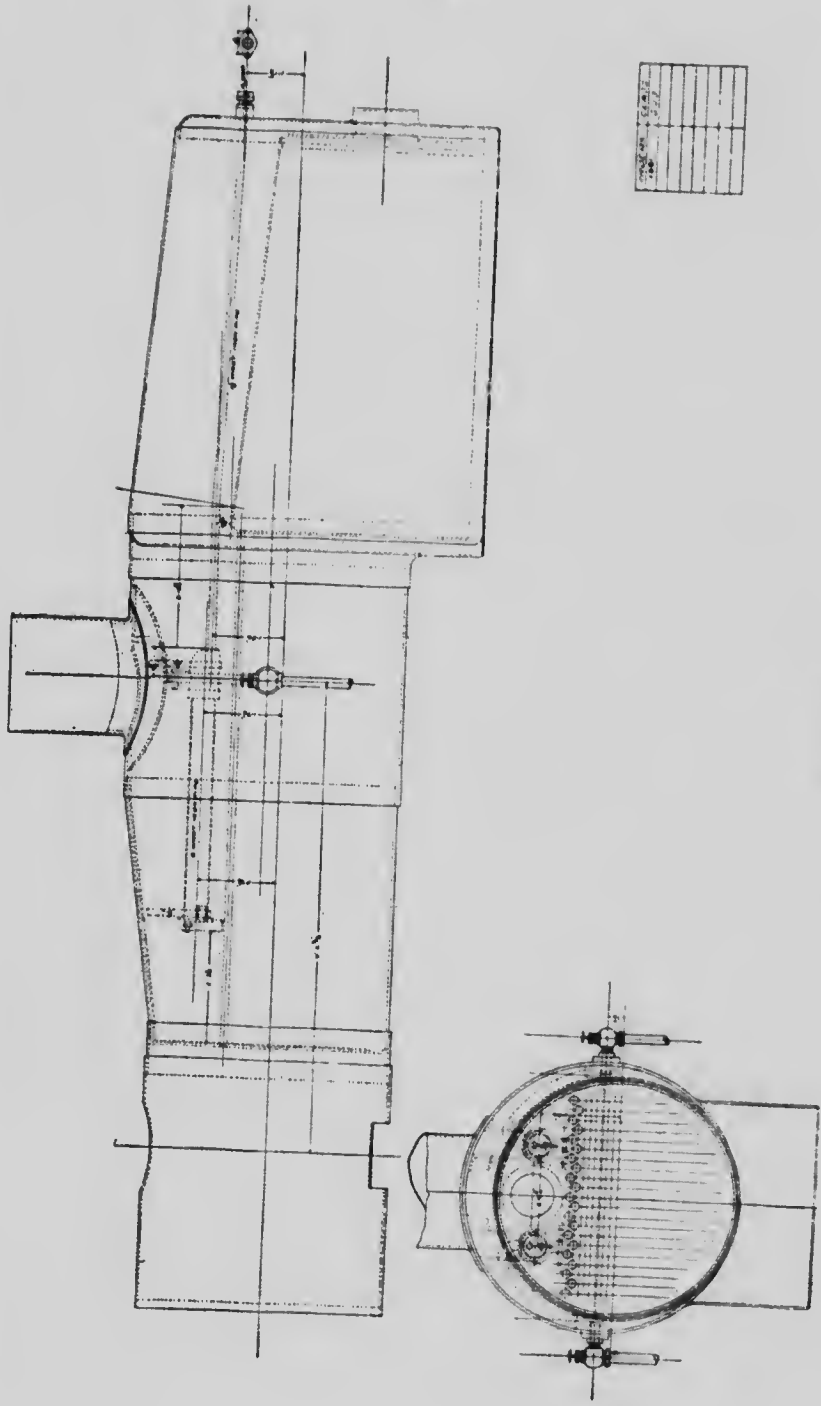
This brings me to a conclusion and I beg to sum up as follows for the improvement of the water system so that gradually the serious difficulties with which it affects the motive power either by quality or scarcity may be overcome:

- 1st. The appointment of a Water Engineer who shall have charge of all matters pertaining to the supply and management of it.
- 2nd. That the appliances for precipitating and separating the scale forming solids in bad water districts be perfected as quickly as possible.
- 3rd. That where the natural supplies such as the rivers and streams are insufficient that the country necessary to form dams and reservoirs shall be surveyed and estimated.
- 4th. That those sections which offer an easy solution with the aid of larger tenders shall be summarized as quickly as possible and the necessary plans and estimates set up as quickly as possible in order to get the improvement established.
- 5th. That the boiler designs and designs for improving the feeding and circulating of the water in the boilers be tested on new engines for the alkali districts.

Chairman—Mr. Cross has given us a very exhaustive and clear paper on prairie waters; it is a very able one. We will now hear from Mr. Lake.

Mr. H. B. Lake—The great prairie stretch is one of the most difficult countries through which any railway could have run, due to the water containing so much saline matter, quite apart from matter in mechanical suspension.

Mr. Cross's statement regarding salts remaining in solution being beyond the resources of the chemist requires qualification. Experts differ as to the amount of soluble salts that will produce foaming, and the question is one for experiment. It is my intention to make exhaustive experiments under boiler conditions. It seems to me from tests upon stationery boilers that the amount of salts in solution in the seven analyses submitted would not cause foaming to any serious extent. It will be our endeavor to pay the greatest attention to obtaining the largest amount



DRAWING 6403.

of water where it will require either the least amount of treatment or no treatment at all, but I am afraid we will have to use quantities of water requiring treatment.

One of the analyses Mr. Cross has chosen is Field, I should not have chosen that as bad water myself.

Distilled water (pure) and rain water are more detrimental to the tubes of boilers than water containing a certain amount of scale forming matter. In fact, in large cities where very pure water has been obtainable, municipalities have had to add lime or chalk to cause a small deposit on the interior of the water mains to prevent it attacking and dissolving the metal away.

Now when rain water passes through the atmosphere it absorbs certain gases, particularly nitrogen, which is present in the atmosphere in four times the quantity of oxygen; the other is carbonic acid gas which is dissolved in large quantities. The rain water in descending absorbs these two gases, also oxygen, and the acids thus formed causes limestone, iron salts and other mineral matter to dissolve and make it a hard water.

The impression has been created that soluble salts can be removed after chemical treatment by filtration, whereas only matter in mechanical suspension can be removed by filtration. It is stated that by varying the circulation or heating the water before it reaches the boiler that salts in solution beyond the scale forming matter would be precipitated. From my experience with waters, and in chemistry, I know that if the water is left in the locomotive too long, it becomes a concentrated solution of these more soluble salts and even in that state matter would not be precipitated.

If we wish to prevent heat radiating we cover steam pipes with an insulating covering and when locomotive flues are covered with scale they are *insulated* and not only resist the heat passing to the water, but keep the metal wall of the tube warm, so that it becomes over-heated and EXPANDS creating forces tending to force it into, and simultaneously enlarge the holes in the tube plates, and, if the scale is thick enough, the metal itself is altered in physical constitution which may be clearly seen by viewing a highly polished and etched section under the microscope.

The general practice to remove this residue resulting from the use of saline waters is to "wash-out" the engine involving a cooling down of flues and boiler from over 400° F. This causes a SEVERE CONTRACTION of the tubes again disturbing the physical constitution of the metal and creating forces which tend to draw the tubes out of the plates and at the same time contract their bulk in the holes.

It is this ALTERNATION repeatedly going on which entails the greatest expense and is responsible for the majority of engine tube renewals, boiler repairs and engine failures.

At five places on the Central Division (Portage la Prairie, Douglas, Brandon, Broadview and Moose Jaw) the amount of water taken by locomotives per month represents 40 tons of scale and sludge forming matter. A portion of this is being removed by our treating plants though I am unable to state figures, as the comparative analysis I am making are not yet complete. However I am quite certain that nothing like the amount is being removed which is possible to be removed.

From analyses on record I compute there to be at least 200 tons of scale and sludge forming matter taken by locomotives over Western Lines per month. Taking the number of locomotives at 500, the average heating surface at 2500 sq. feet and the newly deposited scale at a density equal to limestone, this would equal a deposit of .023 or 1-4 x 1-64th of an inch in thickness, uniformly over the heating surface of every locomotive in a month.

It is generally accepted that with 1-16 inch scale 10 per cent more fuel is required to be consumed in the same time, meaning not only extra fuel but increased wear and tear.

Boiler repairs are admittedly over \$1000 per locomotive per annum. A locomotive is in the repair shop ten per cent of its time. Loss of service due to washing out incurs another five per cent of its time, making fifteen per cent dead time on the capital it represents, plus loss of earning revenue.

For the year ending 1904 there were 934 engine failures on the Central Division from all causes of which 487 or 51.6 per cent are directly or indirectly attributed to bad water, but as this number is open to argument, surely all argument will be dispensed with if we say that less than half that number or only 25 per cent could be attributed to bad water. Then the possible saving by having properly treated water per locomotive per annum would be—

Repairs to boiler, 25% of \$1000 per locomotive per annum.....	\$ 250 00
Locomotive representing capital of \$15,000.00 in repair shop 10% and 5% time washing out (take only 25% of this for water troubles). Loss of interest on capital.....	562 00
Loss of revenue whilst in shop, say minimum of 5% on \$15,000.....	750 00
Cost of washing out, about \$60.....	60 00
Increased fuel (total fuel 941,583 tons at \$2.00 per ton) \$2,448,115.80, figured on average of 1-32" scale—5% on total fuel divided between 500 engines.....	245 00
Per locomotive per annum.....	\$1,807 00
500 locomotives on Western Lines (is I understand a conservative estimate) therefore the possible total saving per annum by using treated water would be.....	\$903,500 00
Less cost of supplying treated water at average of 3 cts. per 1000 gals. say \$200 per loco per annum, 500 locos.....	\$100,000 00
Annual profit to be made on Western Lines by using treated water.....	\$803,500 00

After a careful study of softening plants I have designed (with Mr. Busted) a plant based upon principles which I know have given satisfactory results and a number are shortly to be installed and next year I hope to be able to tell you how much scale they have kept out of the boilers.

In addition to this (at Mr. Busted's instigation) I have designed plants for purifying those waters, which, though not containing large amounts of salts in solution, contain matters in suspension to a high extent especially at certain seasons of the year. Appropriations for these have gone through for Crowfoot, Calgary, Stobart, Irvine and Medicine Hat and the work of erecting these plants will go forward at once.

In the meantime improvements are being made to existing plants to increase their efficiency and a proper system of analyses both before and after treatment is going on, so that we shall absolutely know what each plant is doing.

It is highly essential that the chemicals be supplied freshly and regularly to every plant and that there be proper provisions to keep them fresh until used. With this end in view proper chemical houses will be erected at every plant this spring.

I would like to submit, Mr. Chairman, two samples of water from Portage la Prairie, analyses of which I made immediately before coming here. Unfortunately for me the forces of nature, upon which I depend for the success of the treatment, in the plants we are proposing to install,

have done me a very bad turn on this occasion. Mr. Busted saw these samples of water when they arrived and he knows that one of the waters was about the color of that oak table, the other was quite clear. The vibration of the train has caused the small particles to coagulate in the bottom of the flask which you will see as I pass them around. The analyses show removal of 80% of the scale forming matter. A white deposit which you see in the bottom of one flask is due to the inefficiency of the plant in removing the chemical matter after it has been precipitated from solution and is one of the defects in the plants which necessitate entirely new plants being put up at all the places where we take a large quantity of water.

Mr. R. R. Jamieson—The results at Moose Jaw show that it pays to treat water. I am pleased to see the improvement made. In looking over the history of the place, however, it must not be forgotten the improved conditions that exist since I knew it. Two or three years ago the engines were not properly cared for due to the conditions; neither was the water treated. Large tenders were not in use and water from many of the tanks now avoided, had to be used. To the treatment of the water and lessening of the train load is no doubt due the improvement.

Mr. G. J. Bury—There is no doubt about the difficulties of operating engines with some of the waters we are compelled to use. It is unquestioned that the water treatment we have adopted, even in its present embryonic state, has produced results. At the same time it would surprise those present to learn that on the Fourth District where we have the worst water, we had less engine failures during three months last fall than on any other district, partly due to water treatment, but principally through improved round house practice, the use of large tenders which enables engines to skip water supplies that were particularly bad, improved train handling, lessening of the load and the assisting of trains over hills instead of doubling. In my experience all kinds of troubles have been placed to bad water, that were due either to bad round house practice or poor transportation methods.

Mr. J. Brownlee—One of the causes for the lessening of engine failures on the 4th District is that the engines were given a tonnage they could properly handle; another the frequent washing out of the boilers and better round house practice generally. The statistics will show that as detentions increased so did engine failures. We may be making a mistake in looking for surface water, but, to my mind, it is superior to others, as witness Wolseley supply.

Chairman—We have had an exhaustive discussion on the subject. I think we all agree that water treatment is necessary. Our present system was inaugurated three years ago, and while perhaps not the best is one that we are endeavoring to improve. When our plans are completed I trust that a lot of our water troubles will disappear.

The Effect of Train Service in Securing Competitive Freight Traffic

And the Necessity for the Closest Possible Co- operation of the Operating and Traffic Departments

BY F. W. PETERS

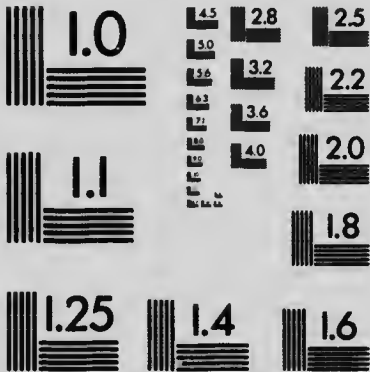
ASSISTANT FREIGHT TRAFFIC MANAGER, WESTERN LINES,
CANADIAN PACIFIC RAILWAY

The first and very natural inclination of the Traffic Officer when asked what is most essential to the securing and retaining of competitive traffic is to answer "us"—we are it—without us it cannot be secured, and without us it cannot be retained; we by our personal popularity secure the business and hold on to it; and if anything should happen to us, such as death or superannuation, it would be a dark day for our Company. Well, as my friend Sam Clarke would say, "far be it from me" to underestimate my value to my employer, but here in a gathering of this kind, of practical men, who are desirous of getting at facts, and where bouquets don't go, let us get out in the open, and without prejudice to our case (our Solicitor has advised me to put that in) admit the fact—Good Train Service is the whole thing. It will, I believe, be admitted by the most narrow and prejudiced Operating Officer that active and tactful solicitation is a necessity in securing competitive traffic. It must be admitted in securing such business we must have men who can gain the confidence, respect and friendship of the shipping public; men with a thorough knowledge of rate combinations, so as to ensure our quotations being as low as our competitors. But all the efforts of our soliciting staff are futile if we do not give our patrons good service—if the goods we have to sell, which is transportation, (we are simply the sales agents of the goods you manufacture) and which our sales agents are pressing our patrons to purchase and representing as being equal or superior to those of our competitors, are found on being purchased by a shipper to be of inferior quality—i.e., not handled as promptly or as well—then, we cannot expect to sell that shipper or consignee any more goods, and you will have to fill out your fast freight trains with more dead freight and way-cars as time goes on. Our representatives may be ever so active; they may advance arguments and reasons for the slow time the last car made; they may put up an explanation that would make the "Wee Macgregor" green with envy—but it won't go with the average shipper. He doesn't mind your experimenting with the other fellow's business, but not with his; he is willing to give you a fair share of his trade if your goods are up to standard; he has a wretched memory



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for the good service you have given him at some time, but a horribly clear recollection of the bad; he traces his descent from the old State of Missouri, "you've got to show him," and the result of a fall-down in time on one car often costs a Railway hundreds of cars; our soliciting agents are turned away from the door with the statement that we have misrepresented the quality of our goods, and we very soon find ourselves in the condition of "Davy Brown's garden thrush."

There was a time, not long past when the conditions affecting competitive traffic were different than now. Time was not considered an important factor, particularly in the West; evolution in transportation facilities has been rapid, but the time of the Stage, and the Mule train, and the Red River Cart, is still within the memory of the Western shipper. Then, as competition developed, other methods for securing traffic were adopted. Rates were high, and a cut here and there could be made and still leave profitable earnings. This practice—I am thinking now of conditions in the United States—grew steadily; the larger the shipper the greater leverage he had to secure reduction in his rates, and we all know the result of this unsatisfactory condition. Legislation was introduced imposing heavy penalties for discriminating in rates. It is true the original legislation in this direction was defective, but by the passage of what is known as the Elkin's Amendment to the Interstate Commerce Law, and the more recent action of the President of the United States, a lower rate than published tariff, or a rebate has become a thing of the past. Therefore, as the trend of public sentiment grew against the old practices mentioned, and these practices began to disappear, the Railways looked to other methods of securing a greater share of the competitive business than their rivals, and improved service was adopted; better cars, improved tracks, reduction of grades, better engines for freight service, more active solicitation, and regular schedule for freight trains followed rapidly. Keener competition and more economical operation soon had the effect of lowering the freight rates; legislation, as referred to, has had the effect of the publication of the tariffs, which are absolutely maintained, and every shipper knows what rates he has to pay. The rebate evil in the United States, above referred to, had its effect on Canadian legislation. Our Government, realizing the growth of Canadian traffic and the consequent growth of Railway competition, passed an Act, with which we are all familiar, and while I have no intention of criticizing that Act, I think it is not out of place to say that the foundational principles of that Act are sound, i.e., to make it illegal for a Railway to give or a shipper to accept, a rate of transportation other than that published in tariffs and open for the public inspection. To a shipper who has one hundred cars to move, it does not seem reasonable that he should have to pay the same rate as the man with only one car, but, fortunately, in Canada the objectionable features referred to in the United States have not obtained; consequently there is less difficulty in enforcing the Canadian Railway Act, and, our shippers have come to realize the futility of trying to get preferential rates. It has, for these reasons, become more imperative than in the past, that the best service possible in the transportation of freight should be given.

A man made the remark to me the other day: "What strikes me most forcibly about you C. P. R. men is, you think you and your bloomin' old road are just about as near the right thing as can be found on top of the earth." Well, just between ourselves, so we are. We are the salt of the earth, and our road is the greatest organization and the best managed transportation company on God's green earth and ocean blue. We are "it," and we know it, and we can punch the man who says we are not; but is there not the danger, when we have this feeling, of getting chesty and under-rating our competitors, who, by the way, are getting rather numerous just now? Are we not inclined when some one suggests another route for the movement of his freight to pooh-pooh the idea and

say, "Oh, they must know we are the best people, none of these jerk-water roads are in it with us, etc.?" I remember when I was younger and less corpulent than I am now, a boy a head shorter and with six inches shorter reach, thought he had some rights in the school playground. The idea to me was absurd—because of the shorter reach referred to—but one afternoon, while engaged removing some teeth that had lost their usefulness, and washing up a badly disfigured face, I made a solemn vow never again to under-rate or treat with contempt any fellow I was to come in competition with, no matter if he were shorter in the reach. Quick side-stepping makes up for a whole lot of other deficiencies, and I find the side-stepping of some of our present competitors extremely interesting. One of our Superintendents recently, when I was comparing our time with that of our competitors, said, "Oh, don't you ever think they are making the time they say they are, etc." He was right to this extent, the shippers or consignee will always exaggerate the good time our competitors make; but we should be in a position to show, first, as good time in an individual car as our competitor, and then, as good average time on a given number of cars; if we can't, we can't sell them any more goods.

When our proportion of traffic is not satisfactory to the management, the Superintendent is disposed to believe that it is not the fault of the service, because does he not operate his division more cheaply than any other division? Is not his percentage of tonnage to power away up, etc.? "The trouble is with our punk soliciting staff." "It is all their fault, they don't push our goods," etc. Now it does not become us to speak of ourselves too much; besides, that modesty which is the leading characteristic of a traffic man, prevents my speaking of the qualifications of our soliciting staff. That they are better than our competitors goes without saying. Morally and intellectually they are better. We are all members of the Church—that is, we are members of all the Churches—we work both sides of the street—but, as I have said before, our superiority counts as nothing if our goods are inferior in quality.

Now I hear the Superintendent of Transportation or the General Superintendent of a Division say: "If it costs too much to provide these goods, we are better without the business; you are selling more goods under promise of good quality than it pays us to manufacture, because of our high standard of quality." Well, we admit it costs more to manufacture a good article than a poor one, but can you not, by increasing your trade to a large volume, so reduce the cost of manufacture per ton that it becomes profitable to turn out the good article at the market price? Is not too much importance attached to the expense of running fast freight trains? Is it not sometimes forgotten that by far the largest expense of a Railroad consists in its original investment in right of way, track, stations, rolling stock, and in keeping these in repair? These expenses exist regardless of the quantity of freight carried. The profit from carrying a large volume of freight at low rates is very much greater than the profit from carrying a small volume at high rates, because of the fact that a large part of the expense of a railroad is fixed, and not affected by the amount of traffic carried. Interests on bonds must be paid; track and equipment be maintained, regardless of the amount of business done. Probably half of a Railroad's expense is of this fixed sort. In view of this, is it not of the greatest possible importance that we increase our traffic as much as possible, and if competitive conditions compel us to lower our rates or improve our service, by furnishing a more expensive service, we must face it, and of the two evils choose the lesser. Another reason, and a very important one, for the best possible dispatch of Trans-Continental freight, is one that has no reference to our rail competitors—or rather, it is the reason which has forced our rail competitors to bring their standard up to the highest possible stage of per-

fection. Probably no one here realizes the fact that to-day more than half of the tonnage on the American side, originating in territory east of the Mississippi River and destined to the Pacific Coast, goes by sea. That seems incredible, but it is a fact. We have seen the finish of the sailing vessels, but we have a stronger competitor in the steam vessels. The American railways are realizing the seriousness of this important service in competition with them. Steam vessels that use oil for fuel are a much more serious proposition to compete with than the old "wind-jammer" of ten or twenty years ago. In the past, the smaller proportion of our revenue producing traffic was competitive. The rapid extension of competing lines is fast changing this condition, and in a few years but a small proportion of our traffic will be non-competitive. Therefore, the sooner we adopt a high standard of service, the better will we be able to hold our present traffic, and to prevent inroads into our business when territory now local to us becomes competitive. Let us cut the pace for the other fellow, not have him cut it for us.

Now a few words on giving preference to competitive freight. It is a fair general statement to make that competitive freight is of longer haul than non-competitive; hence the necessity for close connection at terminal points, and faster time over each division, than is necessary for local freight. A few hours' delay at divisional points, and slow time over a division, soon runs into days on a car that has to cross the continent. When a car is two weeks on the road the owner is usually more anxious to get it than in the case of the car destined to a local point that only takes a few days to reach its destination under ordinary circumstances. Our fast freight trains should be so timed that there would be no reasonable grounds for their not arriving at divisional points sharp on time; close connection should be made, and the train run just the same as a through passenger train. If one of our through passenger trains becomes too heavy for one engine, and has to be run in two sections, the second section follows, regardless of the number of passengers. I contend the only proper way to handle our through Trans-Continental freight is to move every car of it daily on train 117; fill the train out if you will to a reasonable extent with local or O. C. S. freight, or run it light, but run it, and run it in two sections if the first cannot clean up every car of such freight out of a terminal point. Do this, and our traffic will increase. Fail to do it, and you will slightly decrease your cost of operations, but over half your expenses—i.e., your fixed charges—go on just the same and your business falls away.

I am well aware I am treading on dangerous ground when I advocate running freight trains light over a whole division, when by holding your power, say twelve hours, you accomplish as much with one engine as you would with two. I am free to admit an absolute daily schedule means at times an expensive service, but when we meet a "ground hog case" let us face it and do the ground hog act.

I have spoken of fast time on competitive freight. I do not wish to be understood as favoring indifference to the handling of local traffic. Many a mile of competitive railway has been built because of the indifference to the needs of a community shown by the Railway which exclusively served that district, but I repeat my opinion that faster and more regular time should be made on through Trans-Continental freight than on local, because there is greater need.

Some of our officers believe some classes of competitive freight should be red-carded and receive preference over other commodities to the same destination. With due respect to such opinions, I believe this is not a proper policy, leaving aside, of course, the question of perishable freight, which is susceptible to damage by the weather; also live stock, which of course, should take precedence. I believe one car of competitive freight should receive the same service as another, whether it is a car of cement or a car of canned goods, whether it pays 10th class

rates or 3rd class. I do not believe in red-earding by commodities (excepting perishable freight, as stated), but by the competitive importance of the traffic. The man shipping the car of cement doubtless controls traffic of a higher class, and the chances are he wants his cement just as badly as the other man wants his tea.

Now a word or two on the value of harmony and co-operation between the Operating and Traffic Departments. In mentioning this subject it must not be assumed that there is any want of such harmony and co-operation in our service. If, during the early years of the construction of our road, when everything was to "get there," there was some such absence of co-operation, it has rapidly disappeared; and I know of no road where there is so strong an *esprit de corps*, as in our service. There is, however, the danger of either Department getting the idea that they are the whole thing, and omitting to keep in close touch with the other. The result can only be loss to the Company. While I, personally, as I have intimated, have no reason to complain of want of harmony or co-operation, there are frequently instances where the traffic officers are forced into a position which might, in the minds of some, be looked upon as "butting in;" where they might be considered as interfering with the prerogatives of another Department. It is only human nature for a man to resent the interference of another in his particular duties or business, but if at times we are found taking a hand in such questions as warehouse sites, private spurs, the purchase of supplies for the Company's use, and in many other matters, I would ask our friends of the Departments where such matters properly belong to remember that we are frequently drawn into such questions against our wish.

This Company has only one source of revenue, except, of course, its Telegraph and Land Departments, from which to pay dividends to our stock-holders, operating expense and salaries to ourselves. The latter item is a very severe tax on our revenues. When I say this I have no reference to the salary paid to any particular Traffic Officer that I know of, but, as I say, we depend upon the man who pays his freight and his passenger fare for the principal portion of our revenue. That man is constantly assured by our soliciting staff when he gives us the routing of his business, that we are under obligations to him, and, when he requires something that is, perhaps not controlled by our Department, he does not know the Superintendent or the Purchasing Agent in the transaction. He says, "This is something in return for what I have given them. I am entitled to it and I will demand it from the man to whom I have given my business, and to whom I have paid my money." That is why he comes to us, and looks to us to secure for him what he considers he is fairly entitled to. If we simply refer him to someone else he takes it as a slight. If he does not get what he wants he retaliates by diverting his business to our competitor. On the other hand, if he gets it, it gives us another leverage on his future business. There is also the advantage, from a traffic point of view, in securing industries and storage warehouses on our tracks, instead of allowing them to be built on those of our competitors. I know Superintendents who are not always in favor of additional spurs and additional track warehouses, because they add to the working expenses of their terminals, but of two evils we should always choose the lesser, and, while the man located on our terminals at competitive points can route his freight by our competitors, he will, in nine cases out of ten, give us the preference and the large majority of his business.

I therefore ask our operating friends, should they at times think we are interfering with their rights, to remember that we are all working for the same object—that of increasing the revenue of our Company.

I feel that this is a subject that is so well understood by the heads of both Departments on our Western Lines, that it is needless for me to

dwell on it, beyond suggesting the importance of heads of Departments impressing upon their subordinate officers how valuable such co-operation is, and by their example, showing their next in command how much depends upon "team work." Inroads are being made daily on our traffic; competition will continue to increase; our competitors will attack us in our weakest spots and we will have harder fighting in the future than we have had in the past (and the past has been no picnic). We must, therefore, "play the game." This is too big a show for anyone to "star" in. We want no "grand-stand players." "Harmony and co-operation" is the word. We have a road and a management we can well be proud of. We are particularly fortunate in having with us as Chairman of this meeting and the leading officer of the Company in the West—one who is the apostle and embodiment of the harmony and co-operation I speak of; and it is, I am sure, the wish and hope of every officer here present that he may long be with us in this capacity.

I will now close these scattering remarks with the hope that this meeting will be of great benefit to us all, and value to the Company we serve—(and fast time on competitive freight)—and, in the words of old Tom Lindskey, the first superintendent we had, which he addressed to each engineer on pulling out of Winnipeg in 1881 with the one daily mixed train: "Be off, now, and in the name of God make time!"

Prompt Handling of Competitive Freight

BY R. R. JAMIESON

GENERAL SUPERINTENDENT WESTERN DIVISION CANADIAN PACIFIC RAILWAY.

This subject is one that covers an important part, if not the most important part of a Railway's operation, the handling of freight being the largest part of its transportation service. "The prompt handling of competitive freight" is therefore, it seems to me, the Railway's most important work. As we all know the real usefulness of a railway depends upon its ability to give satisfactory transportation and the more satisfactorily the work is done, either in the handling of freight or passengers, the better service is given the public and the more fully the franchise of a railway is warranted. In other words, the more efficiency in transportation the greater service to the public performed by the Railway and the greater the advantage to its owners.

In considering the prompt handling of competitive freight, we might first take package or less than car-load freight. Merchants shipping such freight should be advised that it will be received at the Company's freight sheds up to a certain hour—say 5 P.M. or 17 K.; any such freight delivered after that hour being liable to be held over until the following day. Up to 17 K. such freight should be received and passed through the shed direct to the various cars being loaded for the several competitive points, a car-load being made up for each station where possible; cars for such freight being carefully selected as to fitness for fast service and so placed on the house track that they can be moved from the freight shed first without disturbing other cars being worked. This "L.C.L." competitive freight in car-loads should be red-carded with a card having a large letter "C" printed on it as quick information to all concerned of the contents of the car. Way-bills should be stamped "Competitive" and enclosed in envelopes also so stamped, and cars started out in time for the most distant car to reach its destination and be placed at the freight shed for delivery at 7. K. of the next day. Thus on a run of say 100 to 200 miles from the loading point, a car containing L.C.L.

competitive freight for the various towns along this run would be placed for delivery the morning following its receipt by the Company. The same handling should be given freight for distant competitive points, and where full car-loads cannot be made for beyond junction stations, part cars should be loaded for junction points, where freight, if any, to come out can be removed and competitive freight that is collected at such junction points can be promptly added and car go forward for distribution to the smaller stations along branch lines.

In the handling of car load competitive freight the same should be red carded and billed as above mentioned, switched out promptly at the close of business at 18. K. each day and made up into, as far as possible, solid trains, the cars for furthest competitive points being placed to the rear of the train and so on to avoid switching *en route*, and trains started out on fast freight schedules under designating numbers, such numbers being used consecutively and the movement of these fast freights reported from each train terminal point, the car numbers in such trains being wired under the letter "C" and designated number of train so that close check may be kept on the general movement of such traffic by the Central Office. Cars of competitive freight should be collected at junction points and added to such trains. The clerk in charge of fast freight records should be, preferably, one having experience in the Operating Department, conversant with schedules of trains, grades and other conditions of a local nature on different parts of the line.

In order to ensure schedule time with such freights, all terminal yards should be piped for air so that air-brakes can be promptly tested, fully looked over and train charged before the engine is coupled on. Engines on these trains should not be loaded as heavily as they now are the engineer having a greater amount of energy available than would be constantly in use would thus be in a position to overtake unexpected delays that are sure to occur on long runs. Train Dispatchers could thus count on such trains making regular performance and could give such orders as would carry them over the section without requiring further interference or additional stops to re-arrange orders; each extra stop causes delay that must be regained at the expense of the engine if from no other standpoint than the consumption of fuel. Therefore if these trains are run 15 per cent. light under normal conditions instead of ten per cent light as at present it would, I am sure be a step in the desired direction of maintaining our fast freight schedules.

Further, regular engine and train crews should be assigned to the runs and engines kept in the best possible shape for the performance required, instead of being sent out on these trains hap-hazard as at present. It is just as necessary for the satisfactory movement of fast freight to have regularly-assigned engines and also crews, who will appreciate the work to be done and the conditions to be met from day to day, realizing their individual responsibilities to make time as it is to assign regular engines and crews to passenger service. When selected engines and crews are used there is an individual pride in making the record required that is not obtained where any engine or any crew, whose turn out it may happen to be, is placed on the train. The train thereby loses its distinctive, important feature and the men naturally reason that if any engine, no matter whether in good condition or not, is considered by the Company to be sufficient for the satisfactory handling of the train, its movement cannot be of the importance that circulars and special instructions from time to time would indicate.

I think our greatest need at this time to secure more satisfactory handling of competitive freight is in our train performance, and to this end I would particularly recommend that regular engines, engine crews and train crews be assigned to such service; and I may say that so far as I am able to judge there is nothing in our wage schedules which prevents such an arrangement, and if there is it should be eliminated. Further,

engines should be so distributed as to allow such trains to be handled through intact, and thus avoid the breaking-up of trains at any terminal: where necessary to take care of accumulating competitive freight in long distance movement a second section of such fast freight could be started.

The hands of our Freight Traffic officials should, and would be strengthened if fast freight schedules were absolutely maintained, and they would be relieved of any temptation to exaggerate or prevaricate in advising shippers of time that can be made by having to draw upon their imagination, which, in a pinch, "to get or not to get" is at such a time inclined to be slightly over active. They should be able to assert our adherence to our fast freight schedules in the same confident manner as our Passenger officials rely upon our passenger schedules, and shippers could then be given these schedules with the same measure of confidence and assurance of actual performance as passengers are given time tables.

Mr. H. E. Beasley,—As we are two hours late in the discussion of this paper, I shall endeavor to make my remarks as short as possible.

If it were for no other reason than mere gratitude I think it is our bounden duty to help out traffic after listening to these papers. The question of how to do it is what bothers us most. Mr. Peters has covered the ground as to what the traffic requires and I think Mr. Jamieson has laid down a very fine plan as to how it should be done, but what we want is the wherewithal to do it. There is one error stated from a Superintendent's standpoint, viz., the traffic officer naturally feels that if the Superintendent does not move the traffic he is trying to save money, that is the cry. I do not believe this. I think that every Operating Officer on the road is just as anxious to move competitive freight as the traffic official, but unfortunately we have not had the necessary appliances but I think we are working in the right direction. The records during the last year on competitive freight have certainly been excellent, with few exceptions, as compared with previous years in British Columbia, but there is room for improvement on some sections east. It is a question for serious consideration whether we should run trains light if there is no traffic. If we adopt Mr. Jamieson's suggestion of using assigned crews on fast freights, and have no business and run them light, we are going to be subjected to criticism on expense, so it appears to me that the first point to overcome is for the traffic officials to state where and when they require such service, and then for the Operating Department Officials on each Division to establish and maintain such. We are practically doing so, but have had no authority to run our trains light and this is a point that requires consideration. One of the chief reasons I presume that we have not had the desired results is the shortage of power. Well, I think there has been sufficient discussion during the past two days to show very good reasons for that, but as stated before, we are on the high road to improvement. So far as our own Division is concerned, I would like to take this opportunity of stating that it is the first year that we have had an adequate supply of power, and have made big mileages notwithstanding. There is another point in connection with competitive business that deserves perhaps more consideration than has been given it, viz., less than carload competitive freight. We have had a big number of complaints at different times from small shippers or from wholesale merchants, who have, say three or four cases of dry goods, and they are put into a car, which is not a through car, at the point of shipment in the East. Another difficulty from a Superintendent's standpoint is this; we get advice of competitive shipments and have not got the requisite staff to look it up promptly. I think it will be found by Mr. Price, if he looks into the matter carefully, that advices that should have gone to our Superintendents went to the Car Service Agents. This is at points where the Car Service Agent is not located. Where they are located at the headquarters of the Superin-

tendent such records can be used to great advantage, but at other points I think there is necessity for improvement along these lines. There is another question that arises frequently in connection with competitive freight, and that is tonnage contracted for by the Officials of the Traffic Department and no notice sent to the Operating Officers. As is well known our power has been taxed pretty well, and at times there is a rush of freight beyond the ordinary run, referring of course to districts where power is limited, and we get no advice of it. Now, I think the Traffic Officials when contracting for large tonnage from connections, which might require another train or two, if they could notify the Operating Official that the traffic was in sight, he could get the power around to meet it and save delay.

With regard to the question of harmony—I do not think after listening to the discussion for the last two days that there is room for improvement on the Pacific Division.

Mr. A. Price.—I am not in accord with the recommendation, made by Mr. Jamieson, that such special efforts be made to ensure fast time with competitive freight, advertising it by cards as competitive, because I feel that one reason why we have strong competition, at least in a part of the territory, is because we have endeavored to rush competitive freight at the expense of the non-competitive. We have had numerous instances of this. Throughout Manitoba people have complained that because they had no competition they were being sidetracked. An instance which occurred a couple of years ago brought down the wrath of one of our Winnipeg shippers. He made a shipment from Winnipeg to a point on the Prince Albert Branch when we had trouble with washouts near Saskatoon. A car containing freight of the same commodity for the same destination left Toronto subsequent to the date of the shipment from Winnipeg, but was red-carded and therefore arrived at the destination first. Now I submit that this was not fair treatment to the Winnipeg shipper. We have a right to give good service with the non-competitive freight as well as the competitive. I may be considered too idealistic in this matter, but experience has shown that the way to produce an agitation for more railroads is to give the Company's patrons an indifferent service in non-competitive territory.

The best way to hold competitive business is to give an up-to-date service before a competitor gets on the ground. We are following out the plan with our L. C. L. freight of making good time regardless of whether it is destined to competitive territory or not. No doubt you are familiar with the plan in effect under which this class of freight is being handled out of Winnipeg and Calgary. We try to deliver to destination all freight shipped from these cities one day, any distance within two hundred and fifty miles, some time during the following day. With freight for a greater distance we run out of Winnipeg to the most distant divisional point short of the first station for which the car contains freight on fast freight train, and way-freight from such station to destination.

I acknowledge the right of the Traffic Officials to have a say as to what freight should be red-carded. On the Great Northern if there is a car of whiskey destined to a non-competitive point and a car of sewer-pipe for a competitive point, the sewer-pipe is handled in preference to the whiskey. I understand Mr. Peters is in favor of adopting the same principle on our line, that is, red-carding on the basis of origin and destination without any regard to commodity. I do not think we can afford, however, to leave out of consideration the nature of the freight handled. Again, if instructions were given to red-card all freight between Winnipeg and Edmonton I would favor doing the same with freight between Winnipeg and Calgary. We should be in a position, and I think we are, to move all long-distance freight with dispatch. I do not mean by this that we should undertake to make fast time with it, but we should be able to establish a good steady record.

We are making very good time with No. 117 between Fort William and

Vancouver. The schedule time of No. 117 (our Coast freight) between the points named is 148 hours and 30 minutes. During last week the average actually made was 146 hours 43 minutes. This might well be considered a good record.

At times cars which should properly travel on No. 117 are held over, and instead of being forwarded on the first train following, they are held up for twenty-four hours so as to catch No. 117 the following day. The reason for doing this is that were such cars forwarded on a local drag train they would be passed by the Coast Freight and would probably make a bad run to their destination. Very few cars, however, are crowded out, as the average number, which might properly be considered as belonging to No. 117 is something like 27 per day, and any overplus would be so small as to make it unprofitable to run a second section.

We have recently established in Mr. Macgregor's office a graphic system for keeping track of red-card freight. Under our old system the record was kept in a book, and was of little service except as a record. We found it was easy enough to get a car into the book, but if it was set out along the line it was lost track of. With the Board one can see at a glance any cars that have been set out, and it is the duty of the man in charge of it to see that all such cars are lifted and handled to their destination by fast trains following.

Mr. G. E. Graham.—I should like to say a few words in regard to what Mr. Price has just said. When he states that for the weeks referred to, although the schedule time was 148 hours the actual running time was 146, that is what the traffic people have complained of, irregularity in the running of the trains. What we want is a uniform service. When a man ships his goods from St. Paul or Winnipeg to the Coast he wants to know when they will reach there.

Now, it strikes me that the only way in which we can secure that uniform service is to have assigned engines and crews and it seems to me that this is the place where some action should be taken in that respect. It has been demonstrated that we have sufficient freight for a daily train, one train every day, and when the traffic people give us the business we want to be able to give them the service. We do not want to have to say to them "We cannot give you the service". Now with our capable traffic organization of to-day I do not think there is any doubt but that they would be able to supply a train every day and if we have a train every day what difficulty should there be in assigning engines and crews?

Regarding what Mr. Jamieson says about L. C. L. freight. We are doing that same thing at Winnipeg to-day, loading our freight up to 17.30 instead of 17.00 o'clock and it goes out that night. As regards freight for Calgary and other points west, that leaves Winnipeg on 117. It is loaded up to 10.30 in the morning and switched out and put on 117 which leaves at 12 o'clock.

At a meeting in Mr. Bury's office a short time ago, the question of assigned engines for 117 came up and it was decided then to try one class of engine, the 130, out of Winnipeg, and this has resulted in a great improvement as the record since that time will show. Only once since then have we had to use a 100% engine.

Mr. J. Niblock.—I am very glad that my chief, Mr. Jamieson, has put forth the question of assigned train crews so plausibly in his paper.

Some three years ago I took it upon myself to assign crews and engines to No. 105, I think it was, and a special train running in the opposite direction. I found during the three months that I carried on that system that I averaged making up forty hours of delayed time per month, this in addition to three accidents I had by broken axles, and various other

causes, and the schedule of that train at that time was an hour and a half faster than it is at present.

However, conditions have changed with me. The trainmen's schedule interfered somewhat because I had not a regular train on the time table running in the opposite direction. Power became scarce in the fall and I was not getting mileage out of the engines that we considered should have been gotten, but from that time since I have never been able to recover that record notwithstanding all the efforts I put forth to do so. You can quite well understand that if you take the crews and the engines first in, first out, you take in turn the new engineer and you cannot expect the new beginner is going to have the judgment to use upon all occasions which will arise over 450 miles of line such as that between Swift Current and Lagran, and these heavy pulls on the way, coming into contact with high winds and so forth, there are numerous things that we have, and we should expect to get that judgment from our senior men if placed upon that run on account of their superiority. This applies particularly, perhaps to the firemen. You get a green fireman on a long run like that from Medicine Hat to Calgary and the new man is exhausted before he gets over half the run, his fire gets bad and he cannot keep up the steam in the engine.

This is one of the greatest difficulties we have to contend with, whereas if the engine is assigned, you have the better men which includes the firemen. You put the senior and better conductors and brakemen on these trains and the consequence is that you get better service and there is less to do in checking them up in these matters and I think that if we renew this system that the Traffic Department will have no cause to complain of having their freight not moved promptly at all times, barring accidents and heavy storms.

Mr. J. S. Lawrence.—I should like to make a few remarks with regard to assigned crews. On our section we have a number of what I would consider important ore trains, which are not on the time card, but five of them run out of one divisional point and in discussing the matter with the trainmen I impressed upon them the importance of running these trains on time and suggested that we must have crews assigned to them, and I found no difficulty whatever in getting them to agree to this. This applies to the engine crews as well as the train crews. Then we have another train that we call the wayfreight, which was put in the time card about a year ago. It was claimed that all time card trains called for assigned crews, and I believe that is correct according to the schedule so that I do not feel that there should be any difficulty whatever in assigning crews to trains 117 and 118.

But in the case of the two trains I mentioned running between Nelson and Ebbot it was found by assigning certain crews to these trains that other crews would occasionally have to lay over longer than it was considered reasonable in some cases, so in that case they agreed that we should run first in first out on these two trains. But I think if you will look over the schedule that you will find there is nothing in the way of assigning engines and crews to any train that appears on the time table.

With regard to traffic officials and competitive freight, I would just like to mention that in their eagerness to secure competitive freight they should be careful not to reduce the rates too low as it is a difficult matter to run light trains when you are only receiving a small amount per ton mile for the freight carried and it has often been a question with me as to whether we should run these trains in certain cases, but as a matter of fact we are often compelled to make a run of 100 miles with light tonnage in order to keep the smelter going and as you are aware the Superintendent is checked up monthly and whenever his cost per ton mile shows an increase he is asked to explain and I should like very much if there could be some understanding here regarding the matter.

The Mechanical Department states that an engine will carry so many tons over each grade and we are checked up on this tonnage although I think that it is a mistake in many cases to try to haul the tonnage we are expected to. In many cases the engine will not handle it satisfactorily. Then again there are other cases as I cited where we must of necessity run light with competitive business and I do not see how that can be avoided if we are to hold the business.

Mr. T. Kilpatrick.—I have listened with interest to the paper read by Mr. Peters and also the reply by Mr. Jamieson and to the other speakers and there seems to be a difference of opinion regarding the improvement in handling of competitive and ordinary freight. In my opinion, we should from competitive points give the competitive freight best possible service, but at the same time, I agree also with Mr. Price that we do not want to let the other freight lie in the side track in the meantime.

I notice, however, that there is no paper regarding the handling of the ordinary freight. It is an open question in my mind as to whether we are not overloading our engines. I took the trouble a short time ago to get some data in the matter and although unable to get all the figures that I should have liked to have got, I found that by comparison that the slow or drag full tonnage freights on the Mountain District eastbound cost 70 cents for the drag as against 71 cents (per ton mile) for 117 and 118, "B" rating trains. That is a difference of only one cent without considering the cost of the extra fuel consumed by the pusher engine which I believe would be much more.

While speaking on this subject I might mention another question, that is, the method of keeping statistics by our Company. I believe these statistics should originate in the Superintendents' offices, and when it was found that there was any excessive consumption of coal or use of supplies, a remedy might then be applied and immediately. At present in regard to some of the items of expense it is weeks and sometimes months before we get the information, so long after, that is not possible for us to apply a remedy. Now, I think a new system should be inaugurated by which a statistical clerk would be placed in each Superintendent's office to make up the necessary data for the Superintendent's information first and that this should be made in condensed form and forwarded on to the other higher officials.

Mr. G. J. Bury.—At one time the Lake Superior Division was considered by the Fourth Vice President of the system as moving freight better than any other part of the system, and its operating expenses stood at the ratio of 85, that is it cost 85 cents to earn a dollar. Several years later it lost its reputation for handling freight quickly, but it cost 55 cents to earn a dollar and the net earnings for the year ending June 30th, 1904, were larger than any other division of the system.

The Burlington built a number of lines west of the Missouri River and started with a lot of business. Shortly afterwards the grasshopper plague came along and their business went to pieces. The Superintendents and Traffic Officers got together and devised means of securing some business, but when they came to check up the cost of securing it, they made another switch, by reducing the number of freights and hauling large trains, following our system and saving one million dollars annually.

Mr. Chairman, you handed us some figures a year ago showing that while our gross earnings had gone up nine million dollars our expenses had gone up eight million eight hundred thousand dollars, and that we were not earning enough net revenue to pay interest on the extra money being expended. Now it is considered to-day when criticising the management of a railroad that if a reduction in expense is made in maintenance that the property is probably being permitted to run down, and therefore shows unwise management. If a reduction is made in

transportation expenses, it is a sign of good management and it is on the financial showing that we depend to run our railroad. The handling, therefore, of fast freight is simply a matter of expense. It is not a very great expense for us to endeavor to run two transcontinental freight trains on time, but if I understand our traffic officers right they are not satisfied with that. I am led to believe and have been hammered at all year to move every car of freight coming off our boats on fast freight time right through to Winnipeg. Unfortunately our road was not built with a 4-10 grade. The maximum was a one per cent grade. We have eliminated the one per cent in some sections, but there is still much one per cent grade. Every officer knows that the only way to handle traffic economically is to get a large trainload. Not having a 4-10 grade we have endeavored to take advantage of every stretch level on our road so as to carry as far as possible 4-10 tonnage. There exists on our first district for instance, three filling out points. Now if our service demands that we start a train from Fort William they can run right through to Winnipeg and make good time, we shall have a one per cent grade. We can haul at least one-third greater size trains and our expenses are one-third less by filling out at grade breaks. It therefore resolves itself into a matter to be settled by yourself as to whether the company has reached that stage when it can afford to increase its operating expenses to the extent that will be necessary to give the traffic coming over the lakes the dispatch that is expected by the traffic department.

Mr. R. R. Jamieson.—Mr. Chairman, I would just refer to a remark made by Mr. Price about advertising our schedules in the scheme of handling competitive freight. I was asked to write a paper on the prompt handling of competitive freight, and it was that object I had in mind and the best means of accomplishing the same. Our ability to secure competitive freight is of course governed by the despatch given. While I would not advocate the neglect of uncompetitive freight, by any means, still we are up against the increasing problem of taking care of competitive freight. We must improve our methods if we are to keep in the running. Of course the remunerative rate is a matter for the traffic people to determine and to deal with but my aim in preparing a paper was to point out how we could handle competitive freight more promptly. As to the letter "C" mentioned that might be used on a card indicating competitive, of course that is only a matter of designation. We might give it "S" or any other letter, simply a designating letter was required and I do not think that the scheme that I outlined would in any way advertise our efforts to handle fast freight any more than it is advertised to-day. We have our fast freight schedules from one large commercial center to another, which is a notice to all concerned that we are out after competitive freight. We do not now put small way stations in these schedules but include the largest centers only, such places as Calgary for instance which is somewhat of a competitive point might be included. We have a road reaching within a hundred miles of that place and it was certainly not the intention to leave the impression that important freight for non-competitive points should not be taken care of on fast freight trains.

We should look sharply after such freight and it was not my idea that we should retrograde in that respect, but to show how we might improve the service, and possibly increase the revenues by handling this traffic in a more satisfactory manner and not lose the numerous large amounts our traffic people tell us we have lost in the past by not giving better despatch to competitive freight.

Mr. F. W. Peters.—Mr. Chairman, I believe it is not in order for one who reads a paper to refer to it again. However, I was going to say probably this discussion is about ended; perhaps, I may say a few words in

closing either in referring to my own, or in referring to Mr. Jamieson's paper. Mr Price made the remark that he is not in favor of running a second section of 117 for one car but prefers to let that car lie over at Winnipeg for twenty-four hours. Now I am not going to enter into any controversy with Mr. Price but would it not be better to run a second section and fill it up with other freight and run it over the section and in that way instead of losing twenty-four hours only lose one or two? This is a point I think should be considered. If it were not for Moose Jaw where we receive freight from the Soo line and with which the car might be consolidated there might be more in what Mr. Price says, but I think we should remember that there are two points which feed us with competitive freight, Winnipeg and points east, and Moose Jaw, which means the Soo Line, and I still believe that a second section should be run to clean up every car even if there is not more than one of the class of freight for which 117 is run.

Mr. Bury has made some statements, and has given us some figures, and that is his strong suit, I cannot question them, I would not because I have no doubt they are correct, but figures are sometimes dangerous things to handle, they may be loaded, they can be twisted. The period he speaks of when the Lake Superior Division reduced the cost of operation and got a good reputation for cheap handling of traffic may possibly be the period when we began to find the greatest inroads made in our competitive freight from Eastern Canada to the West by the American Lines. At one period our service went to pieces, and I can say this that the moment a Superintendent undertakes to operate his division at a minimum cost, traffic is going to suffer. I do not think so much should be attached to the difference in the cost of running a train so as to make schedule time. Mr. Graham touched the point when he said we do not want particularly fast time on this freight, but our merchants on the coast want uniformity in the time and strict adherence to the schedule. The Seattle merchants tell us they are willing that we should take a day or two longer than the Great Northern or the Northern Pacific provided we can tell them when their goods will reach them. They want us to give them definite information and then be able to depend upon it. It does not make so much difference to the large jobber when he gets his goods in as long as he knows when they are coming, for he keeps a large stock on hand and he has to arrange that stock.

Mr. A. Price.—Mr. Chairman, I would like to answer Mr. Peters' question about running a second section of 117 from Winnipeg to Moose Jaw with a car left over at Winnipeg. There are two reasons why we cannot undertake to do it. We have not always the tonnage on some of the sections to warrant the running of another train, as practically all the west-bound tonnage is usually taken care of by No. 117 and the way freight. The other reason is that No. 117 can handle all the tonnage belonging to that train originating east and south of Moose Jaw, and the car left over, if sent on by drag train, would be passed by No. 117 of the following day.

As to the remark which Mr. Graham made, I would not want it to be inferred that the time of 117 during the period referred to was irregular. My recollection is that the train went into Vancouver on time at least four days and I think five days out of the week. On the other days it was not very late and on these days it came late from the East. We cannot be held responsible for that especially when we are doing all we can to get the Eastern Lines to deliver it to us on time. When they do this I think we will get it into Vancouver on time almost invariably.

A lot of the trouble has been, not that 117 was not making good time but that the freight that should be put on 117 was not handled on it and all the Superintendents and General Superintendents know what difficulty we have had in getting the terminal staffs to observe the instructions about putting on that train cars with freight for points in the distant West. I think we have succeeded now and that all understand

that these trains 117 and 118 are put on to handle through cars and freight for long distances. These trains are handling that freight now and when I tell you that the record for the week was two hours better than the schedule I do not think anything can be said against that record.

Mr. O. O. Winter.—Mr. Chairman, this question is getting so close to home that I must say a word or two thereon. As a matter of fact there was difficulty in the yard staff understanding what freight was to go forward on No. 117, in preference, and I may say the Superintendent as well as the yard staff lacked calibre to keep up with instructions received from various superior officers, through the pounding of the Traffic Department and other officials, and numerous orders as to what was to go forward on No. 117, until a recent revision of the whole order and a thorough understanding, which has not been tampered with, I must say the yardmaster was "up against it", as he was censured as often for not sending cars for Winnipeg or other competing points beyond Winnipeg on No. 117, as he was for not sending Coast and Kootenay freight on the same train. Under those conditions we cannot very well blame the Division Superintendent altogether, although I admit he did not do as well as he hopes to do in the future on the handling of the business, but he cannot be blamed entirely because there were too many instructions, and too many classes of freight to be handled on that train.

I am furnishing our General Superintendent with information as to the way fast freight is being delivered at Fort William by extras scattered all through the day from one hour after No. 117 has arrived until the next No. 117's arrival. I took the matter up with the Superintendent of adjoining division, hoping to cut out some work for the General Superintendent's office, and was advised that he was powerless to do anything, that he was receiving trains as they were delivered us. Then I referred the matter to the General Superintendent who will no doubt do what he can to better the matter. It does seem to me, however, that somebody east of Fort William does not understand the necessity of prompt movement of strictly competitive freight for the Pacific Coast and Kootenay points.

At present we have a good many difficulties to contend with in getting a train for No. 117; just now we can handle it all on one train, but, as Mr. Peters says, it will increase and this means holding ten, fifteen or twenty cars for a second section unless we make up a train consisting of that and other freight and watch it closely over the division. I think myself that the "Johnny on the spot" can do a whole lot to follow the movement of all and especially fast freight, but in this connection again we are constantly hampered in the matter of power. If we had a portion of the money invested in power at this time and during three-fourths of the year, that is in cars that are standing idle, we would get a current movement of the traffic that would give less cause for complaint of delay to competitive freight.

Economic Use of Western Coals

By R. BARNWELL

FUEL AND TIE AGENT WESTERN LINES CANADIAN PACIFIC RAILWAY

I shall endeavor at the outset of my paper to bring before your notice the increased growth of the coal mining industries in Southern Alberta during the past four years, the importance of this industry to our Railway Company, the building up of that portion of the country and the general benefit to the community at large.

Prior to 1903 the only coal mine in Southern Alberta was that of the Alberta Railway and Irrigation Co. at Lethbridge, which is more familiarly known as the Galt Mine. At that time there was no town between Cowley and Blairmore, and none between this latter point and Michel, now they are intersected by the large and prosperous towns of Frank and Coleman.

The rapid growth of these two towns, each of which is mainly supported by the coal mining industry, is phenomenal, and with their already large populations they must necessarily be the source of a considerable revenue to our Company.

It is further encouraging for us to know that these two towns were in the first place indirectly built up by our Company and to-day we are taking a large percentage of the output of the three mines at Frank and the one at Coleman.

The mine of the Canadian American Coal and Coke Co. at Frank, more familiarly known as the Gebo mine, was the pioneer, or the first mine opened out in Southern Alberta.

This was followed by the mine of the West Canadian Colliery Co., at Lille, formerly known as Grassy Mountain, which was supplemented later by the opening out of their mine at Bellevue.

The mine of the International Coal and Coke Co. was also opened out about the same time as the Bellevue mine.

Previous to the opening out of the Gebo Mine at Frank, our Company had to draw largely on the Galt mine for its supply of coal for the Western territory, but with the rapid growth of population, in what was known as the North West Territory, which largely depended on the Galt mine for domestic supply, the output of the mine was not sufficient to meet the requirements of the Railway and the domestic supply.

It was then found necessary by the Railway Company, in order that the public should not suffer any hardships during the winter months for want of fuel, to draw its supply from another mine, and with this object in view, encouragement was given to the opening of the Gebo mine.

An important point to be considered, as all the coal we take from the Frank and Coleman mines is used east of these points, which necessitates the supply of empty cars being sent from the east, was that providing the coals were found satisfactory, to draw on these nearest available points and thus avoid the expense of long haulage of coal required for the use of the Company and the return empty cars.

The first trial, on engines, of the Frank, then called Blairmore coal, was made under the supervision of Mr. Bury, now General Superintendent

of the Central Division, and Mr. Brownlee, now Superintendent of the Fourth District, Central Division.

These gentlemen reported favorably on the merits of the coal for locomotive use, and on their report the Management decided to encourage the opening out of the mine by taking its full output.

Along the main line between Moose Jaw and Medicine Hat, Galt coal had been used on engines for twenty years, enginemen had become accustomed to its use, and while the Frank is undoubtedly a much better engine coal than the Galt, and does not clinker, yet as it requires more skilful firing, many of the enginemen were prejudiced against it, and had it not been for the firm persistency of Supt. Brownlee, who was then Road Foreman, in overcoming the prejudices against the coal, it is an open question, in the mind of the writer, if the mine would not have had to close down.

The closing down of the Frank mine would have been disastrous, in a financial sense, for our Company, as it would have stopped the opening out of any more mines, or other industries in Southern Alberta, and while the Galt mine might have partially supplied our wants during the summer months, we would, during the winter months, have had to haul Pittsburgh coal from Fort William to Swift Current, a distance of 936 miles against 341 miles from Frank.

Our Company being deeply interested in the prosperity and building up generally of this Western country, the Second Vice-President decided in the early part of last year, to still further encourage the growth of the Western country and Coal Mines by using Western coals, in the territory east of Moose Jaw to Portage la Prairie, and when the output of the mines would permit to bring it as far east as Winnipeg. To this end encouragement has been given to the further development of the mines of the West Canadian Colliery Co., at Frank and the International Coal and Coke Co. at Coleman.

A large smelter for zinc, complete with laboratory, has been built at Frank. The advantages of this town and Coleman are such that other industries will no doubt soon follow.

At the time it was under discussion by the Management, to bring Western coals east of Moose Jaw, the cost of the coal, with freight, haulage and return empties, was thoroughly gone into by the Superintendent of Transportation, who found that the cost of the coal at the mines and the cost for extra haulage as far east as Portage la Prairie, would entitle it to competition with Pennsylvania Coal.

As the Pittsburgh is an easy coal to fire, and had been generally used on engines east of Moose Jaw since the building of our road, it was reasonable to expect there would not only be complaints, but a general prejudice against the Western coals.

This, I am pleased to say, has been happily overcome by those in charge of the Operating Department in that territory, only a few complaints have been made against the coal, and there would probably have been the same number of complaints had we been using Pittsburgh coal in the same territory.

There will always be a few complaints on coal with the large bins of the Link Belt, known as the McHenry chutes; each bin holds forty to fifty tons coal, with the result that the lumps roll down to the mouth of the chute and slack or small stuff clings to the back. The result of this is that some engines get all lumps while others get all slack or fine stuff.

We have tried several schemes to mix the lump and slack without effect, and I would now ask the Asst. Chief Engineer, Mr. Busted, to make a note of this, and see if some improvements cannot be made with this build of chutes, that will overcome the trouble mentioned.

The calorific or heat giving values of the Frank and Coleman coals are equal to those of the Pittsburgh, they also carry about the same percentages of fixed carbon, but run higher in ash.

The coals are of a friable nature, and break easily by handling, this latter is also aggravated by the seams lying at a very high pitch and the coal in some cases has to be brought from the upper workings to the main entry, where the mine cars are filled, down chutes varying from three to nine hundred feet at an angle of from fifty to eighty degrees.

The mine people exercise all the care they can to keep the chutes always full, so as to avoid breakage of the coal but it comes down with such a force, that, do the best they can, considerable of the coal gets broken.

I mention this for your information, as I know the coals carry a very heavy—too heavy—percentage of slack. I am repeatedly taking this matter up with the mine owners, they are trying to overcome it by not giving explosives to the miners free of cost, as formerly, but are charging them for what explosives they use.

I hope eventually to get them to abolish entirely the use of explosives in mining the coal and mine entirely with picks.

A test of these coals was made last fall, between Winnipeg and Brandon, under the supervision of the Assistant to the Second Vice-president, and although the fireman had not previously fired Western coals, the result on the consumption per 1000 ton miles hauled, was fairly equal to the Pittsburgh coal.

While from the character of these coals, the best results will, no doubt, be got out of them on engines with wide fire boxes of the 780 class, or semi wide fire boxes of the 700 and 1600 classes, the real success will depend on the coals being fired intelligently and to the best advantage.

These coals, similar to the Canmore, are slow to burn and perfect combustion can only be attained by firing lightly and frequently.

This was fully demonstrated by a letter from the Superintendent of the Second District, Western Division, to his General Superintendent, the early part of last month in which he reported a bad run made by extra 538 on Lethbridge section on January 9th.

Mr. Erickson stated he rode on the engine, the fireman threw six or seven shovels of coal on at a time, and so buried the fire that the coal could not get combustion.

He further stated that a fireman, named F. Stauffer, had never as yet failed to keep up steam on any engine he had fired. I mention this to show how much depends on intelligent firing.

This is defied thus—the intelligent fireman should notice in which portion of the fire box the coal is being consumed the quickest, in order to know where to sprinkle over his next shovel of coal.

The lazy fireman, who throws on a number of shovels of coal at one time, and does not closely watch his fire, really has the hardest work, as the engine draft will not draw sufficient air to get through the big body of coal, and give the required combustion.

This results in his having to frequently poke the fire; the fire box door being open so much, cold air coming in at this point cools the gases in the fire box and reduces the efficiency of the boiler.

There is also another trouble with the lazy fireman—failing to get the required results through poking his fire he resorts to shaking the grates, and shakes holes in the fire where more perfect combustion has taken place.

These holes allow air to get in the fire box, in a greater volume than is required at that particular point, which also results in cooling the gases in the fire box and reducing the efficiency of the boiler and he is in constant trouble because he cannot keep up the uniform pressure of steam.

The experience is that the shaking of grates should be avoided when engine is running, as fireman cannot control the fire so effectively as when the engine is at rest.

The mine people at Frank and Coleman, recognize that the success of their properties altogether depend on giving us coal of good quality, the

best their mines will produce, and that we must have it free from impurities.

The picking table at the Gebo mine at Frank is too narrow to do as good picking as I would like, but they have had an up-to-date table on order for some time, and it will be installed as soon as the work of the new lay out of the yard is done.

There is no picking table at the Bellevue mine at Frank. It was the original intention to instal one there but owing to their striking rock faults last year, and losing the main large seam, the installation of a picking table was deferred, until it is ascertained beyond doubt that the mine is a workable property.

I will not deal with the Canmore mine. The output of this mine at present is limited to 10,000 per month.

The coal from this mine was formerly shipped east to Medicine Hat and west to Rogers Pass and Revelstoke.

From Revelstoke, West, Comox coal is used.

As empty cars have to be sent to the Pacific Division, the Second Vice-president instructed that some of these empty cars be taken around by Frank and Coleman and loaded with coal there for Calgary, Bassano and points on the Edmonton Branch and when made empty sent on to Canmore to be loaded with coal for the Pacific Division.

Besides the saving on price of coal, there is a considerable saving also effected on haulage, as empty cars have to be sent to Vancouver for bringing the Comox coal east.

During the past year there have been numerous complaints made against the Canmore coal, it being claimed by some of our officials, who are well qualified to speak on the matter, that the coal is not as good as it was some years ago.

This may, or may not, be the case, it must be borne in mind that the passenger and freight trains, now being hauled are much heavier than they were some years back, possibly faster time is being made by passenger trains, with the addition of steam heat for coaches, and the coal is generally being put to heavier work than formerly.

By referring to Blue Print form S. O. 50 issued by Mr. Leslie, I find that between Laggan and Field, eastbound, where the heavy work is done, the engines on that section, have made a better showing on the tonnage hauled than the year previous, this was particularly demonstrated last November when the saving was upwards of 20 per cent. compared with the same period previous year.

I know that Messrs. McNeill & Co. are thoroughly alive to the importance of giving us the best coal their mine will produce, they recognize that some of the small coal carries sand and have lately at a considerable expense put up a gravity washer at Canmore for washing the sand and impurities out of the small coal.

The washer is capable of handling 400 tons per day, unfortunately they have had some breakdowns, on the start but our Inspector at Canmore, wrote me a few days back, that it was then working in good shape and it was expected that the full output of the small coal would be washed in the course of a couple of weeks.

They have also during the past year set up a picking table at Canmore and with ordinary care, very little rock should get into the Railway cars.

Messrs. Jamieson, Hall and myself, were at Canmore in December last, we closely watched the men at the picking table, who were doing good work, our Inspector assured me their work was then no better than usual.

Trainmaster Carey has been associated with the Canmore coal since the mine opened, and as he is daily watching the performance of the coal by actual use, he is more competent than myself to speak as to its

quality generally and if he considers the contention set up, that the quality of the coal has deteriorated, it is correct.

It may not be out of place for me to ask our officials when there are complaints of engines not steaming to occasionally turn up the reports and see how long that particular engine has been in service.

My object in asking this is that while there may be some little changes in the qualities of coal, it is not to be compared with the varying conditions of a locomotive and complaints may be made against coal, which in some cases, if closely looked into, would be found to be due to the condition of the engine.

With regard to the coal from Bankhead mine, tests and analyses have demonstrated that the saleable sizes namely egg, stove, nut and pea, are practically equal to the Pennsylvania hard coal.

The Bankhead coal is really easier to regulate in stoves and furnaces, than the Pennsylvania, but as it is of a friable nature and slacks somewhat, while in transit, and also by handling, it should be cleanly screened before being put in coach bunkers for Baker Heaters.

As the mines have not many orders during the summer and are overcrowded during winter months, we should help them during their slack period by laying in a sufficient stock of coal, for coaches, at terminal points to carry us over the winter.

To do this sheds should be built at several terminal points, so as to keep the coal under cover, if exposed to the weather it not only depreciates, but it cannot be cleanly screened.

The Bankhead mines make a large quantity of small coal, what is termed Buckwheat; it would appear the only use that can be made of this small coal is by mixing it with soft coal and using it on engines'

It would be well to have the views of some officer of the Mechanical Department and Road Foremen, on the successful burning of this small coal.

I would here call the attention of the officers of the Operating Department to the importance of arranging a more regular supply for the Western Mines.

At the present time we are practically carrying no stocks of coal, west of Winnipeg. The output of the mines, with a full supply of cars, will only give us about one thousand tons per week for stocking purposes, or in other words in excess of the current consumption.

The closing down of the mines for one day only is a very serious matter for us, more particularly at the present time, as there is a probability of labor troubles in the U. S. coal fields, and I would for our own protection earnestly ask the Officers of the Operating Department to arrange that the mines have a regular daily supply of cars.

If I am correctly informed, the fixed charges of the Gabo, Lille and Coleman mines amount to \$200.00 per day and while there may be an impression that this loss does not fall on our Company, the matter is worthy of consideration, that while we do not pay it directly, if we do not pay it indirectly in more ways than one.

Mine operators naturally want to work their mines so as to make them pay at least a fair interest on the invested capital, this can only be effected by tonnage, hence in order to make up some portion of the tonnage for the lost time caused by car shortages, coal is apt to be surged too thick and fast over the picking tables for the pickers to do good work'

In conclusion, I invite the fullest criticism on all the coal, my understanding is that we have met here for the mutual good of the Company; if there is anything can be pointed out to be done, that is not done, whereby the qualities of the coals can be improved, or to the advantage of our Company, it should and will be my duty to see that such improvements are put into effect as far as practicable.

Mr. J. Brownlee.—Mr. Chairman and Gentlemen,—We must all feel indebted to Mr. Barnwell for the information he has given us, as to the amount of benefit the company and country have derived from the opening up of the Western Coal Industry.

There is no doubt that if the Railway Co. had not assisted in the opening up of the Western Coal Mines, there would still be very little coal mined in the Western Country.

The figures he has given us as to the business created thereby, must be very encouraging to all employees of the railway, and all well-wishers of the West.

I notice, however, that Mr. Barnwell starts his paper with the development of the Frank Mine, and gives this mine the credit of being the first to be on the market with steam coal, in the Western Country. I think Mr. Barnwell has overlooked the fact, that the Canmore coal was really the first Western coal that was used on locomotives, and I think I am safe in saying that there was more prejudice against the Canmore coal at the outset, than there has been against Frank or any other coal, that was mined in the Crows Nest district.

There was all kinds of trouble burning the Canmore coal, and had it not been for the persistency of the officers in charge of the Western Lines, at that time, I do not think that the Canmore coal ever could have been made a success. In Mr. Barnwell's paper he gives General Superintendent Bury, and myself a great deal of credit for the successful use of the Western coal, but I think Master Mechanic Cardell, now at Calgary, who devoted hours and hours of his time experimenting on engines, then running out of Canmore, deserves as much credit as any one else, in connection with the successful use of Western coal.

Mr. Barnwell's paper puts the cause of Western coal not being so popular, or as good as Pittsburgh coal to two reasons: first, prejudice of the men against the coal, and secondly, the extra work there is in firing it. I will deal with each point separately. When prejudice exists there must be some reason for it, and it is only reasonable to suppose that the men will prefer to burn the coal that is easiest handled, to that which will cause them extra work. In the first place Pittsburgh coal burns quicker and does not require the same attention, or work that the Western coal does, nor do they burn as much of it. We all know, that now-a-days the object and aim of all men is to get along with as little manual labor as possible. Therefore, there is good reason why there should be prejudice. This brings me to the second reason: The extra work involved in burning the coal, as Mr. Barnwell says this coal has got to be fired light, which means that it has got to be put in the fire often, which causes extra work, and in order to get results, this is absolutely necessary. Of course the more energetic the fireman is, the better results we get. Mr. Barnwell says there is more ash in it, than in the Pittsburgh coal, but no clinker. I cannot agree with him as far as the clinker is concerned, as I have a sample of clinker taken from the fire-box of an engine burning this coal. No doubt if we got the coal pure we would not get the clinker, but we get a great deal of impurities in the coal, which forms clinker, and it is impossible to get rid of it at the mines. This being the case and the large increase of ashes, which Mr. Barnwell admits.

I would like to know what effort has been made, as far as the engine is concerned, to over-come the extra work entailed, in the burning of this coal, outside of altering the front ends with a view of increasing the forced draughts. There has, as far as I know, been nothing done, and the men can be excused if they believe that the saving in burning of this coal, is all taken out of them.

I think it can be shown that there have been more troubles and delays near the end of the run, than at the beginning, on account of the fires being dirty and the ash pan full. This is no doubt caused by the men trying to get in without the work of cleaning the fire and ash pan, although by

doing so they make extra work for themselves, by the use of the poker and extra coal is used. As I said before the company has done nothing outside of sharpening up the draught, through reducing the size of the nozzle, or alterations in the draught pipes, in the smoke box.

We still use the old style of grates, which do very well for the Pittsburgh Coal, but in my opinion, they are not adapted for the use of Western coal. As I said we have a great deal of impurities in the Western coal, and a piece of slate or shale not bigger than a marble, will stop the grates from closing, and the fireman has then got to open the grates, which will either cause him to dump the whole fire, or tear his fire into holes, and it will take him some time to get the fire in shape again. This frequently causes the tubes to leak, and consequently a failure altogether.

If a grate could be used that would be strong enough, and with sufficiently strong shaking gear, so as to guarantee crushing the small pieces of rock, or shale and clinker, it would not be necessary to open the grates wide, and would overcome a great deal of the difficulty referred to. With the present style of grate shaking attachment, they wear very quickly, and soon get so much lost motion, that it is hard work to get anything shaken through. Mr. Barnwell says that the grates should be shaken lightly, very often, and when the engine is working steam so that the blast on the fire would loosen the fire on the grates, and enable some of the ashes to get out of the stack. With the grates such as I have referred to, this could be very easily done.

I understand there has been a different grate used on some parts of the Pacific Division, with the result of fewer tubes leaking and a saving in the consumption of coal, and a much larger nozzle. I understand that a great many roads to the South of us have adopted ash pans that can be opened from the cab, which does away with the necessity of the fireman cleaning the ash pan, which is not a pleasant job at the best of times. I would not favor an ash pan that could be opened when the engine was in motion, but would strongly recommend one that could be dumped without the use of the ash hoe, and the extra work of the fireman cleaning it out.

I think I have said enough to show that the company has not done all they can to improve the conditions, as far as the burning of this coal is concerned, and I hope that the Mechanical Department will look into the matter with a view of making the required improvements, and show the men they are not expected to do it all.

If this is done the men can very easily be drilled into doing their part as they will get better results, and with less work than they now have to do.

It might appear that I am taking up the defence of the men too much in this, but such is not the case, as I know of no one who has worked harder than I have to show the men how to use this coal, and when necessary have shown them by firing myself, the best way to get results.

Every one must recognize the fact, that a full head of steam means economy in fuel, and every effort should be made by the company to make it as easy as possible for men to get steam on the engines, and where it would cost considerable to change the grates and ash pans, I am satisfied that the cost would be fully repaid in the way of a saving in fuel, and in the appreciation of the men.

Mr. C. Carey,—I have had a great deal of experience with Western coals and in the case of the Canmore had to make many changes on the engines; I finally succeeded in burning it satisfactorily.

Chairman,—Gentlemen, we have at this meeting a gentleman who is not an officer of the Company, but who has had a large experience in coal and coal mining, and as the subject is one of great importance to this company, we cannot get too much information on the coals and their use, and I have therefore, pleasure in calling upon Mr. Stockett, of the Bankhead coal mines.

Mr. L. Stockett,—I am glad of the opportunity at this meeting to say something upon the subject of Western coals. Having been actively engaged in the mining and marketing of them on this and the other side of the line for the past fifteen years, often under the most discouraging circumstances, success has in every case been the reward of perseverance. The successful burning of these coals will not be accomplished at once, many grievous failures and disappointments will be met with, but by sticking to it, learning a little here and there, and especially by free exchange of experiences at such gatherings as this, will that ultimate success be reached which is the ambition of every man in whatever he undertakes.

All Western coals are good, but some may be better than others. The trouble is not from the coal, but the impurities in it, and Rocky Mountain coals contain a greater proportion of these than Eastern coals. To get rid of these demands thorough preparation, and it is up to the operator to see that this is done, unless he does, he cannot expect to sell his coal, but whenever it has been done the coal has met with success. The coal being prepared, we must make the machines or apparatus to fit the coal and not try to adapt the coal to the machines, which have been gotten up to burn other coals.

One of the first Western coals with which I was connected was what was known as the Sand Coulee coal, mined from the same fields as these under discussion, and which coal was for a time a by-word throughout the whole western country. The first trials of this coal on the Great Northern Railway were absolute failures, the Claims Department of the road having to pay claims for fence posts and fence rails which were used to get the light engines back to the round-houses. By staying with it and by adopting proper appliances to prepare and burn it, results are now obtained nearly as good as from the eastern coals, 42 miles to the ton having been made by engines on passenger trains, and 25 miles on freight trains.

Western coals, being high in ash, and lower in volatile matters, combust more slowly, the gases generate slower, and having a slower combustion, require different appliances for burning them than the eastern coals. The requirements to meet these are, shaking grates of the proper pattern to remove the ashes from the fire, with ash pans which will hold a larger amount of ashes, and a large grate area with proper adjustment of the blast. I have seen several of the types of shaking grates used on the C. P. R., but have not seen them all; none of those I have seen were to my fancy what was required, and upon this grate will depend the success or failure in the burning of these coals. My idea of the proper grate is one with a larger percentage of air spaces to admit sufficient air to the fire, and one in which the fire can be shaken without dumping it, and also so constructed that there is no danger of a rock getting in between the sections and hanging up the grates, and in case of a rock getting in with the coal, it will simply be jiggled back and forth over the top of the grate until removed at the end of the run or sooner. With a large grate area, which can be most evenly fired by increasing the width of the grate box, a large amount of coal is in combustion at a time, but burning more slowly, the total amount is no greater over a given run. The proper arrangement of the draught is a matter for which there is no fixed rule; this matter must be gotten at by experience, usually two or three trials will determine what is required. When the coal is inclined to clinker, the introduction of steam below the grates will often prevent this. In one case which I have in mind this was done by placing a half-inch pipe underneath the grate and around the outer edges of the same. This pipe was perforated with small holes inclined toward the fire, and by keeping live steam continually on the fire, it had the effect of softening and preventing the clinker, which had before overrun the grates and often required to be cut out with a cold chisel at the end of the run.

It is a fact not generally known or appreciated that the Rocky Mountain coal field of Canada is not only a large field, but one of the largest in

the world, containing all varieties of coal, from lignite to anthracite, and containing domestic, steam and cooking coals, and in time will not only be the source of supply for Western Canada, but a large portion of the States to the south, giving employment to a large number of men and supporting a population many times greater than the present population of Alberta. As all this directly and indirectly means traffic to the railways, it seems to me that the present policy of the C. P. R. in encouraging the building up of this industry is a wise one, one that will greatly add to their revenues in the near future, and the furtherance of which should command the best efforts of all of us.

Relation of the Telegraph to the Railway

With Special Reference to the Operating Department

BY S. S. JENKINS.

GENERAL SUPERINTENDENT TELEGRAPHS, WESTERN LINES
CANADIAN PACIFIC RAILWAY

I am asked to read a paper on the "Relation of the Telegraph to the Operating Department," but as I understand that this convention has been called to discuss ways and means to improve the service generally, I feel at liberty to enlarge the theme to cover the relation of the Telegraph to the Railway, with special reference to the Operating Department.

In connection with the relation of the Telegraph to the Operating Department, those of us who have even a slight knowledge of physiology know that the nerves constitute the great actuating power in the human body, and in like manner, the Telegraph may be said to constitute the great actuating and vital force in the operating of the Railway. When telegraph communication is interrupted, the movement of trains practically ceases, for while certain provision is made for such emergencies, results are insignificant. The vast expenditure on permanent way, rolling stock, etc., etc., would be, without telegraph service, commercially, useless. One, if not the great essential, therefore, necessary to successful operation of the railway, is an efficient telegraph service.

The great essentials for successful telegraph service are adequate wire and instrument equipment efficiently maintained and properly utilized. To provide adequate wire and instrument equipment and to maintain the same efficiently, is the chief service performed by the Telegraph for the Operating Department, but in this connection, I would observe that the Telegraph Department is directly responsible and accountable for such service only to the extent of the control by the Telegraph Department of the agencies necessary to secure such service. The agencies beyond the control of the Telegraph Department are to be found in the Operating Department itself and in the Maintenance of Way Department, and unless there is active, intelligent co-operation on the part of these Departments, the telegraph service cannot be efficient. Particular agencies in the Operating Department, whose services are indispensable in securing efficient telegraph service, are the Train Dispatchers, Agents and Operators. Interruptions occur from various causes, fire, flood, lightning, rock, snow and landslides, wind and sleet storms, train accidents and from interference by workmen along the line by derricks, steam shovels, pile drivers, bridge gangs, etc., etc. The first duty of the Circuit Managers (Wire Testers) when such interruptions occur, is to provide a wire for the Train Dispatcher. Usually at such times, the Train Dispatcher will bestir himself to give assistance but very often when he secures a wire, he is no longer interested. He fails to appreciate the fact that the wire he has, is liable to fail at any time because of interference where the trouble exists and is not at all

disposed to allow the Circuit Manager to do any work thereon, in connection with location of trouble or to have patches made at offices in order to secure other facilities. Circuit Managers do not use the train wire except when absolutely necessary, if only for the reason that if another wire is available, they prefer to use it in order not to interfere with Dispatcher nor to have this important work delayed through use of the wire by Dispatcher at the same time. Dispatchers, therefore, should lend every assistance when called upon by Circuit Managers. In cases where there may be trouble at more than one point covered by a lineman's beat during severe weather, and when night is likely to overtake the lineman before he can cover the ground, dispatchers should give orders to trains when at all possible to stop for linemen to make temporary repairs, which usually will occupy a few minutes and be the means of restoring communication quickly. It has frequently happened, that because of failure to get this done, trouble has remained in all night. Again, in cases of severe trouble and when no trains may run for hours, a light engine is required and Train Dispatchers should be authorized to act promptly on request of the Circuit Managers to furnish same. In such cases, the Telegraph Department would become responsible for any unnecessary use of light engines. That such assistance can be rendered, has been amply shown at various times. Most of us have our limitations. There are Dispatchers and Dispatchers. I have known a Dispatcher working one of the heaviest train sections, who could find the means, apparently with no delay to train movement, to render such assistance in the recovery of wires. Another Dispatcher working a different trick on the same train section will curtly order the Circuit Manager off the wire if he endeavors to do business. In some instances Dispatchers have undertaken to help themselves to wires, to order ground wires on and patches made at offices, without notification to the Circuit Managers, thus putting in more trouble which the Circuit Manager has to clear up, in addition to the original trouble. The Telegraph Department is responsible in this connection and the Circuit Managers should control the circuits. Agents and operators in many cases fail to do the needful. They fail to answer Circuit Managers' call for "wire" and when reported to their Superintendent for such failure, they excuse themselves to their Superintendent on the ground of attention to other work, and nothing is done. In very many cases agents and operators are unable to do switch board work required by the Circuit Manager, notwithstanding a leaflet issued over a year ago giving full instructions with diagrams, and notwithstanding the fact that our Inspectors are continuously travelling inspecting offices and are available to post agents and operators on any points that may trouble them. With these diagrams and instructions, however, any intelligent operator, if he gives suitable attention to the subject, can qualify in a very short time and I think that such qualification should be made compulsory and a time limit given within which they must qualify, evidence of such qualification to be a certificate from the Inspector of telegraph, that they have been fully tested and found qualified. Telegraph service for the Railway, exclusive of service in connection with the movement of trains, is also in the hands of the Operating Department, except at Montreal, Winnipeg, Calgary and Vancouver where this work has been transferred to the Telegraph Department. It, therefore, rests very largely, if not entirely, with the Operating Department itself to see that this branch of the service is satisfactory.

There is urgent necessity that the use of the wires for Railway service business be restricted. Many telegrams sent are entirely unnecessary and in connection with matters that could be adjusted by train mail. Also many telegrams are sent that could be reduced in length, very often, one half. There is need of a rigorous censorship in this connection. Such censorship should be under the direction of someone in connection with the Operating Department of Railway service, suffi-

ciently familiar with all departments of the service, to enable him to act intelligently. The sending of unnecessary telegrams or of telegrams containing useless words has the effect of clogging the facilities and of delaying business of first importance and also increasing the cost to the Company for increased wire facilities and increased operating staff to handle same.

I have now to direct your attention to a branch of the service where efficient service is especially necessary, for the reason that any excuse for defective service is not accepted. I refer to telegraph service rendered by the Company direct to the Public, usually called "commercial business." Here again is a service which, particularly on Western Lines, is largely, if not entirely, dependent upon the services of agencies controlled by the Operating Department with the added difficulty that these agencies are compelled to give preference to telegraph service for the Operating Department in connection with the movement of trains. In other words, if we have defective service in connection with our telegraph service, as applied to railway operation, we have increased difficulty in giving a satisfactory service to the public. Seventy five per cent of the business handled for the public on Western Lines, is handled through the Railway Stations. Defective service in connection with the Company's own interests, is a matter of domestic concern, a family matter, which we may wrestle with or put up with as best we can, but service for the public is a very different proposition. The public does not discriminate between departments. Any explanation we may offer for defective service that has to do with attention given by Agents to Company's own service business is not accepted, even though it be in connection with a train order. The Company operates a telegraph system through Canada from ocean to ocean, connecting at each end with a cable service across both oceans, and advertises the fact extensively in its various publications so that the public have now come to consider that they should obtain better telegraph service along the line of the Canadian Pacific Railway than along any other railway system. The Company's transcontinental passengers look upon its telegraph service as a very great convenience not given by other Transcontinental systems which do not control the commercial telegraph service. The reputation of the Company, therefore, is at stake in this matter and in the same sense as defective service in connection with freight, passenger, dining, sleeping car or other services would be criticised. Patron of the road have frequently expressed their satisfaction with our telegraph service, and the confidence they feel in their ability to keep in touch with their business connections while travelling over the road has been freely expressed. On the other hand defective service has been very freely criticised and any explanation we may give other than for causes beyond the control of any Company, is not accepted. We are curtly told that as we own and operate this system and control our own employees, there is no reason why telegraph service should not be satisfactory. I am aware that our Railway Superintendents and other Operating Officers very often are not impressed with the importance of this service because of their knowledge that the revenue at many stations is small in comparison with the freight and passenger receipts, but in the aggregate it affords a very important source of revenue to the Company. A joint circular was issued over a year ago by the Superintendent of Transportation and myself, approved by the Second Vice President, defining the duties of Dispatchers, Circuit Managers, Agents, Operators and Conductors in connection with telegraph service. These instructions, which have been closely followed up by personal and continued personal supervision by Superintendents and Inspectors, have had a very salutary effect. Since these instructions were issued, there has been a noticeable improvement in the service but nevertheless Agents are disposed to regard commercial service as a side issue the same as express, and Superintendents are not

inclined to reprimand Agents for neglect of commercial service especially if other station work is properly attended to. There is perhaps a feeling that the importance of public service in connection with telegrams is over-estimated. I wish to say most emphatically that a telegram is an emergent communication and the Company having undertaken a public service must perform such service satisfactorily. I wish to emphasize the importance of Railway Superintendents co-operating with the Telegraph Department to insure that instructions contained in the special circular are strictly observed by all employees handling commercial telegrams.

Nearly two million paying telegrams were handled at Western Lines offices in 1905. Between 1900 and 1905, telegraph earnings increased one hundred and fourteen per cent.

Present wire facilities seem adequate and with additions to be made this year, will be fully adequate. In the construction and maintenance of lines we are fully abreast of the times. In the electrical branch and in operation, our methods are also up-to-date, our instruments and apparatus generally being of the latest and best type. The old Callaud or Gravity battery, which has been a faithful friend of the Telegraph, is now being largely displaced by storage battery, both for main batteries and for local batteries where suitable current from power plants is available, and with very beneficial results. The method of conducting wires into stations by means of aerial cable has been largely adopted, over one hundred offices on Western Lines having been thus equipped.

Mr. J. S. Lawrence—The telegraph has done more than anything to assist in the operation of railways. Before its advent the movement of trains was difficult. I take exception to the statement that the Superintendents and Dispatchers are not alive to the necessity of keeping wires up. My experience is that every effort is made in this direction. You understand that in the mountainous country wires are frequently interrupted, and naturally the first thing the train dispatcher does is to secure a wire to move his traffic. The alleged unnecessary use of the wire is open for discussion. It does not apply to my district.

Mr. J. Wilson—We must have the sympathetic co-operation of the Dispatchers. Generally we have it, but not always. Sometimes we have only one wire, out of the whole with which to make a test, and it is necessary for the Dispatcher to give this up for the purpose. The Circuit Manager must be given the hearty co-operation and support of the Dispatchers. Last year we strung 70 miles of copper wire to overcome the damage resulting from the fumes of the smelters. The escape spoken of in the Boundary Section is due to atmospheric troubles.

The censoring of unnecessary telegrams is difficult, but it should be given careful consideration by all Departments. The railroad business is increasing at a greater ratio than the commercial. We had numerous complaints last year with respect to telegrams about hotel and sleeping car space, but in every one investigated the delay was found not to be with the Telegraph Department.

Mr. B. S. Jenkins—This discussion should be productive of good if the Superintendents present will post their dispatchers and agents along the lines suggested. Frequently by ingenuity the dispatchers can give up a wire temporarily and am sure will do so if the importance is brought to their attention.

Mr. J. Tait—The value of the Telegraph Department is apparently not appreciated save in times of trouble. The Circuit Manager is one who is always on the lookout for trouble on the wires. His first duty is to provide a dispatching wire. The Dispatcher after securing his train

wire is not inclined to give it up to enable the Circuit Manager to make further tests. Railway Superintendents should co-operate with the Telegraph Department to enforce special rules in connection with the handling of commercial messages, especially the delivery of telegrams to passengers on trains. We are able to give a telegraph service to our passengers that no other transcontinental line can approach, but we need the Superintendents' co-operation to keep this service up.

Agents should be instructed to give preference to commercial messages. The importance of the telegraph cannot be over-estimated. Important messages from the British Government are passing over the wires every day and the co-operation of the Dispatchers is needed in the case of wire trouble to avoid delay to these messages.

Many messages might be sent by train mail, and I believe in a rigid censorship.

Mr. G. E. Graham—A careful censorship of messages is an absolute necessity, it would cut out verbose communications and indicate matter that might go by mail. The person occupying this position should be independent of all departments.

Chairman—The Telegraph Department is a most important branch. Unless they (the commercial public) are sure of dispatch they will not use our wires. It is so easy to telegraph we sometimes do not stop to think if the same object might not be covered by using the mail. I know that between Winnipeg and Fort William many messages are sent that would answer equally as well by mail. We have intermittent censorship, but we may have to come to a permanent censorship at Winnipeg. We have been at a large expense in providing additional wires with a view to offering our patrons first class service. I am hopeful that the discussion will be of benefit in improving the service.

The Purchase and Handling of Stores

BY F. E. GAUTIER

ASSISTANT PURCHASING AGENT, WESTERN LINES
CANADIAN PACIFIC RAILWAY

The position occupied by a Purchasing Agent is not what the public and a great many officials consider it, one of the easiest and pleasantest possible, among the many in the gift of a large corporation.

The trade very often considers that he is not spending enough, or that he is not giving some individual firm that plenty which is looked for, that proportion of patronage the firm is entitled to; each firm is positive that it is a greater patron of a transportation company than its neighbor, and therefore should be favored.

Our friends in the Traffic Department are met every day with the argument that freight is not routed over our lines because the Purchasing Agent does not give a firm sufficient orders, or at least only a small portion of them; the firms forget that the demand is regulated by necessities, and that many goods can only be used up in several years. The purchasing agent is cajoled, (sometimes threatened) to throw trade in some direction, so as to catch certain shipments, almost irrespective of the cost of supplies; if he is weak enough to do this, then the Management is apt to enquire why Mr. Smith's scales are invoiced at \$36.18 when previously Mr. Jones' lot were sold at \$36.00.

It is no easy matter I can assure you, to keep the balance equipoised to satisfy all interests.

A Purchasing Agent is not, if I may use the expression here, "persona grata", like the Passenger or Freight Agent, who is earning money for the road; he spends it.

But he has his consolation in the fact that he is doing his best, and of being able to prove whenever his actions are questioned by the Management or the trade, that they are O. K.

I have had some pretty hard battles, during my twenty-two years' occupancy of the position in the C. P. R. out here, but I trust the record is a good all round one, I feel it must have been so, or I would not be standing here to-day.

Now there are just a few matters in connection with the purchasing department which I wish to bring under your notice, and which I believe can be of advantage to all concerned in dealing with it.

There is the matter of requisitions,—Superintendents, Storekeepers, and in fact all those officers, who are authorized to make out requisitions, should so arrange their wants as to only forward them to the proper Department once a month.

There are, naturally, occasions arising during the month, when it is necessary to send in special calls for material, but as a general rule, ordinary supplies can be provided for in the manner indicated. Emergency requisitions should be fully explanatory.

Should occasions arise for Superintendents to make immediate urgency purchases in the interest of traffic the invoice of same should be attached to the requisition, when sent to the General Superintendent.

If this was invariably carried out, it would greatly facilitate work in the Purchasing and Accounting Departments; it would enable the Purchasing Department, owing to the quantities called for, to obtain better prices and to follow the orders more closely as to their delivery, and to keep track of the emergency ones immediately, instead of having to straighten them out months after the transaction has taken place, sometimes when the man who made it has left the service.

Stock requisitions should be prepared with care, specifying clearly what is wanted. One pump can mean any kind of pump. When ordering pumps they should be designated, Wood, Steam, Gas or Gasoline, and indicate their Horse Power, gallons of water to be lifted and the head they are called upon to work on, and whether to be used above or below ground and how deep.

Electric motors should be fully described as to their horse power, efficiency, power, factor, etc., etc. Padlocks and locks are made in endless varieties; very often the requisition, in the case of door and desk or cupboard locks, does not mention the thickness of the wood. Valves are another supply which should be fully described, also castings, whether malleable or not; the more minute the detail in the original requisition, the better and quicker it will be attended to by all concerned.

Then again as to quantities, these should be carefully considered by the parties making out their requisitions. Superintendents should scrutinize these; there is a disposition on the part of employees to ask for more material or stores than are actually needed. This especially is the case with lumber; Bridge and Building Masters should be impressed with this fact; it is much better to have this done at first hand, than have the General Superintendent cut down quantities or the Purchasing Department enquire as to the necessity of such large requirements, it saves also unnecessary correspondence and delays. On so large a system as the C. P. Ry. a considerable saving can be obtained by close supervision of the requisitions. I am sure there is no wish on the part of the Management to stint, but there is a very legitimate and justifiable desire to be as economical as possible, with due regard to the efficiency of the service.

By issuing a single requisition a month, it would be also much easier for all concerned to maintain their stock to efficiency point.

Care should also be exercised in not issuing new material or stores before it is positively ascertained that what is in use or about to be discarded is no longer serviceable. Take axes for example, I have seen axe heads perfectly good lying around, when a new handle and a little elbow grease on the grind stone, would make it as good as new.

I would suggest that Superintendents maintain at their District points, or at some convenient point for distribution, a small lumber yard, properly stocked, from which they could draw, and which could be replenished once a month; this could save many requisitions being made, and be of much help to them, providing immediately what they wanted. This does not apply to car load lots for use on new work at given points; it is easier and cheaper to have this material loaded at a Mill and delivered direct to where it is to be used.

It is necessary to bear in mind, on the Divisions west of the Lakes (with the exception of the Pacific Division) that forethought should be exercised in September, at latest; bearing in mind that most lumber mills are closed down during the winter.

I do not wish it understood that Superintendents should order a five or six months' supply in September, in advance for these yards, but that they send in for approval "Memo" requisitions or letters indicating what their estimates in timber and lumber will be for five or six months winter. The Purchasing Department could then make arrangements (after submitting these "Memos" to the General Superintendents for their approval) with the different mills to hold in stock the Bridge tim-

ber, and other lumber, of special sizes, in advance, so that it would be shipped at the proper time, on regular requisitions once a month.

It is no easy matter, sometimes absolutely impossible, to procure bridge timber for our wants in winter east of Golden and Cranbrook; it is a losing proposition to haul it from these points or the Coast, to Brandon, or, as in some cases, to Fort William, in the winter; when by arranging for it in summer, it could have been held for the Company at Kenora, Keewatin, or Fort William.

What I say about bridge timber applies to crossing plank; this is generally called for by Superintendents in May, when it is not obtainable in the quantities they ask for: the size is not generally a stock one.

I said last night owing to the remarks uttered by several of the mechanical heads of the districts, that I would like to see sufficiently equipped District Stores (I purposely omit the word petty because the C. P. R. has grown sufficiently large, sufficiently broad to eliminate anything that is petty) at the disposal of District Superintendents, from which they could draw at a moment's notice the supplies necessary to meet requirements, and maintain the efficiency of their service, without having to wire in to the General Storekeeper for a valve, some brake shoes, or fifty feet of hose.

Time is the essence of most contracts, and the movement of trains whether passenger or freight is a pretty big contract at times, and a Superintendent should not have to wait for general repair supplies.

For argument sake let us suppose that we have \$100,000 worth of stores under one roof, we have total risk from fire, if we carry in six or seven divisional stores \$10,000 worth of stores we diminish in that ratio the risk by fire, and in case of fire in the general stores we could until they were rebuilt or restocked draw from the district stores for the requirements on other points.

Would it not be possible to make out one general requisition good for twelve months, after a conference with the General Superintendent and his subordinate officers, indicating the supplies to be held in stock at district points and have this approved by the Second Vice President so that Superintendents need not make out monthly requisitions: all that would be necessary is that the district storekeeper take stock and refill to efficiency point by the 1st of every month, by requisition on the general storekeeper: it would simplify matters to a very great extent. Emergency requisitions being the only ones that would require the use of the wires.

You must also bear in mind that the mills prefer private trade to ours, there is not the same margin of profit.

Where other supplies are concerned, the trade often accepts orders for certain quantities, feeling positive, in all good faith, to be able to supply them, either from stock or shipments close at hand, (that is the excuse given for delay in filling).

My department endeavors to keep after the delinquents, but their business has been so big, so rapid, especially within the past two months that the manufacturers even have not been able to keep pace with the demand from the jobbers.

I trust, however with this new year, and better facilities in our new quarters, there will be (I cannot hope for none), but less subjects for complaint, especially if the Second Vice President approves my suggestion of having fuller, but fewer requisitions sent in.

If I may be allowed, there is a subject which I would like to bring here under your notice, and which I hope will be of interest to you.

It is the question of Libraries and relates in a great measure to the making up of requisitions. The formation and maintenance of a consulting and reference library at Winnipeg, Calgary and Vancouver. This should enlist the interest of every department at these Division headquarters.

On Nov. 14th, 1904, I submitted this idea to the Second Vice President: I said "A room could be provided in the new building which could be used as a library containing standard reference books on railway construction, maintenance and operation, the latest trade catalogues, railway engineering magazines, papers and weeklies, maps, standard specifications, tests, etc., etc., which could be consulted at all times by the officers of the different departments."

Such a reference library, I sincerely believe, would be of great convenience and much benefit to us all; it would do away with the borrowing one from another, and concentrate in one "local" all the necessary available information, and help make up the requisitions in the manner I have suggested.

At present many Departments are receiving the same publications, at a proportionate cost to the Company, many also have independent small libraries of catalogues, etc.

All this duplication and keeping of individual libraries up, would be done away with and quite a saving in time and money accomplished.

Catalogues, price lists, received by the different departments could be sent in to these libraries, where they could be catalogued the older ones discarded, new ones replacing them, application for those not on hand be made, and the library kept up-to-date.

There is, of course, the question of maintenance, but this need not be expensive; a lady stenographer could be put in charge, whose time, when not occupied with her duties in the library, would be at the disposal of such officers who have no stenographer or whose stenographer happened to be away.

This proposition I submitted at the same time to several of our General Officers and they all heartily approved of the idea. I suppose, that owing to the multiplicity of subjects engaging the attention of the Second Vice President, since then, it has remained in abeyance; I trust that now that I have brought it before you, that it will be carried to a finality.

Later on these division libraries could be extended so as to meet district requirements.

A small committee could easily draft the rules under which they would work.

There is also the question of payment of our accounts for goods and material purchased under Mr. Whyte's control: this is a very delicate matter: I approach it with diffidence, but I feel convinced that if we pay our accounts from Winnipeg, instead of from Montreal, a great revolution in feeling and price would take place out here.

Under the present system, all my invoices, after they are certified correct as to price, and quantities, by the different departments concerned, are sent by the proper Accounting Officer to Montreal for voucher; there they are passed upon by the Auditor of Disbursements.

Not one in a thousand of these invoices, after they leave Winnipeg, are altered; they are then sent back from Montreal to Vancouver or here to the local treasurers for payment.

I do not question the system, it is accurate and surrounded by safeguards, but it is tardy; could it not be as accurate and as well protected through the careful consideration of an assistant Auditor of Disbursements located in Winnipeg, who would only summarize his accounts, under different heads to the Auditor of Disbursements at Headquarters?

This would also certainly expedite payments, and relieve Montreal of much detail.

I hope that these suggestions made by me, and which are the result of a considerable number of years experience, will meet with favor from the Second Vice President, and all concerned.

I sincerely trust that this meeting is not only the beginning of a long series of annual meetings, but that we have smaller divisional ones, three

or four times a year, where we can meet, know one another and interchange ideas; the more we know of each other, the better it will be for us all; by rubbing shoulders many of the rancours and jealousies which often arise from misconstrued appreciations of individuals, or the official actions, in corporations, where so many are employed in different capacities, will disappear, or at least, be lessened.

Very often a few verbal explanations, which it would be impolitic, or unwise to put in writing, will place matters in the minds of men in quite a different light; what seems to be an enormity, an injustice, or an arbitrary measure or ruling, an infringement of privileges, or an impertinence, would appear clear, reasonable and just.

These matters will not only be of great benefit to the Company, but also to each one of us individually, from further knowledge acquired, they must, if nothing else is attained, tend, as far as human power can do it, to harmonize our great C. P. R. Western family.

Before closing this subject of requisitions, I therefore would impress upon all who make them out to bear in mind:—

1. That they be as few as possible,—(last year, I received 3740 requisitions covered by 11032 invoices).
2. That they be concise and clear.
3. That they only call for such quantities as are actually necessary, during one month for the efficiency of the service.

Let me here say that some very absurd criticisms at times are indulged on account of slow deliveries; a clever man once described criticism as the art of telling how things should be done by those who cannot do them themselves.

These criticisms are often unjust; we, in the Purchasing and Stores Departments, are not perfect, nothing earthly is; there are even spots upon the sun, but we are endeavoring to do the best we can under existing circumstances, we have very often to suffer from the lack of transportation facilities, ours are not furnished sufficiently fast, or in sufficient numbers for our wants. I have had on several occasions, to bring this matter under the notice of the proper Departments; the Company's material has often, also to take a side track and remain there, unless rediscarded, when the call arises as to which load is to be thrown out to lighten a train, the O. C. S. car, or the revenue producing one.

We are also, as far as the Central and Western Divisions are concerned discriminated against at the Coast, in favor of the Angus Shops.

Mr. Gautier,—Mr. Genest being unable to attend this meeting has sent me the following paper to be read.

I regret that owing to the existing difficulties with the employees of the Stores Department in Winnipeg, I am compelled to deprive myself of the pleasure of taking part in this, the first Convention of the Officials of the Western Lines, as I feel confident that the result will be most instructive to all who will have the opportunity of being present.

With regard to the part I was detailed to take in the Convention, Mr. Gautier has been kind enough to send me a copy of the paper he has prepared, and I must say that on the whole he has brought out many points which deserve a great deal of consideration. For instance, the manner of handling requisitions, which in many cases are made out in an improper manner as to the details of the material required and, consequently a great deal of correspondence is involved thereby.

As to the method of making out monthly requisitions, this would reduce the clerical work entailed to a minimum; as for instance, supposing that 20 dozen 114 globe valves are necessary to meet the requirements for a month and if this quantity is requisitioned for in one lot instead of ordering in three or four lots, it would thus save making out three or four requisitions as well as doing away with as many entries in the

several books and the passing of an equivalent number of invoices. The same rule applies to nearly everything that is required to meet the demands of the Road. On the other hand such a method would have the tendency to increase the Store balance, but, evidently for some good reason, we are given to understand that the store balance must be kept at the lowest possible figures and with this end in view it has been customary to make out requisitions for supplies under the existing circumstances, and from the following comparative figures it can be seen that we have obtained the result expected by the management. The figures given are exclusive of the value of rails, ties, fuel, stationery, and lumber and timber such as used in buildings and bridges.

	Per Track Mile.
Lake Shore & Michigan Southern Railway Co.	\$448 78
Atchison, Topeka & Santa Fe Railway System	286 00
Chicago, Rock Island & Pacific Railway	225 11
Great Northern Railway	205 00
Minneapolis, St. Paul & Sault Ste. Marie Ry.	127 46
Chicago, Milwaukee & St. Paul Railway Co.	111 16
Canadian Pacific Railway, Western Lines	104 36

Considering the position of the Western lines, so isolated from the principal markets where our goods are bought, it must be admitted that the figures given are most satisfactory, but it is a question whether such a method is judicious in the interests of the requirements of the Company. A certain amount is naturally saved each month on the interest which the Company would have to pay on the larger amount of stock carried, but on the other hand it is possible that the want of adequate supplies leads to delay of the work, as well as to extra expenses, and the question narrows down to which system will yield the best financial results, and on this point I am not prepared at present to express an opinion.

As to the question of establishing lumber yards for each district, I am not prepared to admit that this would be a desirable feature as it would simply mean the duplication of stock and, possibly in many instances, in very large quantities. I should be more in favor of having one lumber yard for each grand division (with the exception of the Pacific Division) providing sufficient stock in order to give the material a chance to dry and not be put into a building a few days after it is out of the water and through the saw-mill. Such lumber used for building purposes is in my mind a waste of material, valuable labor, and fuel in such cases where the buildings require to be heated, as such material in the course of a few weeks shrink to such an extent that the tongue is out of the groove and the supply of oxygen in the building is increased at the expense of the fuel.

I feel satisfied that if all these matters were taken into consideration, that there would be money saved by establishing lumber yards and having the material stored therein at least twelve months before it was used, and thereby giving it a chance to dry and be in a fit condition for building purposes.

With regard to the transportation of store supplies, it is a recognized fact that such cars are invariably used to make up or reduce the tonnage of a train and, consequently, it is nothing unusual for cars loaded with supplies to be indiscriminately delayed. It is a common occurrence for such cars, shipped from Winnipeg, to take from two to four weeks to reach Calgary, and up to six weeks to reach Vancouver. Such a state of affairs cannot be anything but a drawback serious to the requirements of the service, and while the Traffic Department may swell their earn-

ings by giving preference to Pay Freight, other Departments are losing money waiting for supplies which keep their work back by being compelled to make other shifts to relieve the situation. In order to overcome such a state of affairs, I would suggest that the Traffic Department add to their series of cards now in use another with the symbol of the "Red Cross" and that it be used instead of the white card which is at present in use for cars with store supplies, so that all concerned in the handling of such cars will be prompted with the desire to give same all despatch in order to relieve the pressure in their respective departments of the shortage of goods, and that such cars be given preference after the red disc cars. If such a method were adopted I am satisfied that the cause for the many complaints made about the shortage of supplies would at once be removed and would also reduce to a minimum the correspondence thus entailed both by mail and telegram.

There would be cases where it would be necessary to use the red disc card instead of the cards suggested above, but these, of course, would be left to the discretion of those immediately interested.

At the Storekeepers' Convention, held last May in Chicago, I had occasion to talk to many of the storekeepers on this matter, and it seems that on railways south of us store supplies are given the preference of even pay freight, it being realized that the Road cannot be carried on profitably without supplies and consequently every effort is made to get them to their destination.

Had I more time at my disposal I should be only too pleased to go into these matters closer, but, as already stated, existing circumstances prevent it.

(Signed) L. O. GENEST.

Mr. S. J. Hungerford,—I regret that the General Storekeeper is not here to-day. Several factors have militated against a satisfactory service, the chief being that our facilities to manufacture all that was required were too limited, and the fact also that we had to transfer our works to the new plant. It certainly is necessary to facilitate the manufacturing at our works that material such as bar iron shall be carried in sufficient quantities to prevent delays. With the enlargement of the business the retail methods must be abandoned and we must grasp the work in a wholesale way. In the matter of requisitions from outside places there is room for improvement. They should come direct with as little delay as possible.

The selection of stock to be carried is also a very important matter. If this is handled judiciously the demands can be met with comparatively little increase of stock. The General Storekeeper can help himself in this matter by a frequent conference with the heads of the Departments he has to provide for and a standard stock list to guide him.

Mr. C. H. Temple,—The question of the prompt delivery of the stores to the round houses is a most important matter and always before the busy season begins, such as the grain movement, the outside stores should be well replenished. We should not have to complain at such times for the want of standard articles such as bolts, nuts, draft rigging, brake material or any other articles which are of daily requirement. Besides this, the general stores should be well supplied at such times so that rush demands may be supplied at once.

Mr. J. Cardell,—The shortage of stores is certainly a very serious obstacle to our business and those divisions distant from the General Stores materially suffer most. There have been great delays in filling requisitions and delay again after shipments are made. We know of goods being on the way and we look out for them from day to day but

days grow into weeks and thus we are handicapped. During the past year this has been our experience and we have had to "rob Peter to pay Paul" continually in order to keep the power moving.

Mr. S. Phipps,—There has been considerable trouble experienced in the past for want of staple articles such as lamp glasses, wicks, carbon, etc, and it is too bad to think of the amount of wiring that takes place to hurry such goods forward, when the stores run out of these goods. Last May we placed an order for new steel pedestals for Shay engines at Nelson. After several months delay, Storekeeper asked if the requisition could not be cancelled. Owing to delay in furnishing material we are regularly compelled to rob one engine to keep the others going. This not only applies to engines under general repair but we are frequently compelled to rob engines in back shop for road engines.

Mr. G. J. Bryr,—In the absence of the General Storekeeper I do not care to criticize too freely, but the delay in furnishing supplies has been so bad that I have had to bring the matter up at the conference with the Superintendents and General Storekeeper. I would urge that the stores balance sheet be made flexible so that a proper supply of stores shall be available all over the system.

Mr. J. Niblock,—I am glad Mr. Gautier has shown the advisability of strengthening the Divisional stores. I know of cases in which the Company has lost hundreds of dollars for the want of a keg of nails at Calgary. Many instances in other ways might be mentioned and they all would impress the fact that the regular lines of stock such as the above should not be allowed to run out.

Mr. Price,—Several of the speakers have referred to the delay in handling stores over the line. I may say that if they were loaded in accordance with the regulations they would make just as good time as red card freight. We have arranged for stores for Calgary to go direct, and small supplies for intermediate points to be shipped as regular freight. This would be an improvement over shipping in one store car which necessarily is delayed at all points where goods are required.

Mr. Graham,—The Stores ship goods up to 12K and the car goes on 117 that night or next morning.

Mr. J. Cardell,—Mr. Price's method still needs improving. Goods go to the freight sheds and we have to hunt for them there at times.

Mr. J. E. Schwitzer,—Mr. Gautier suggests that the stores should be kept for each District. This is necessary as by this means material (say for section house or section) could be carried to complete an order and have it all shipped at once. By this means we could easily compete with contractors as they can receive a contract and place their orders and receive the material at once.

Mr. Jamieson,—I just want to say a word in approval of Mr. Price's plan of expediting movement of store supplies. As regards delay in the freight sheds at Calgary, that is local. The agent should issue the same advice to the Storekeeper as is issued to other consignees. It seems to me that there is a weakness in the Divisional Stores of stocking up to best meet the requirements. I am heartily in favor of establishing Divisional lumber yards as recommended by Mr. Schwitzer. The Western Division requires at least one such yard.

Chairman,—The paper read by Mr. Gautier and the discussion has brought out the fact that insufficient stores of different kinds are kept on hand. It has been our desire to reduce the stock to the lowest limit

consistent with efficient working, and Mr. Genest's paper has demonstrated that the orders issued have been faithfully carried out, as we carried less goods to the mile of railway than any quoted. While we saved in interest, we may have lost in other respects, and while it is bad management to carry more stores than are required, still it is not good management to be short of needful articles.

This, Gentlemen, will close the papers we have met to discuss.

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