

very much in size on the face, & we have been making a space between bearings of 14 ins. The tie is supposed to be at least 8 ins. I think that system is better than a given distance between centres, where ties vary in size. I think you get a more equalized bearing for your rail that way. Of course you have no idea then how many ties you are going to have under your rail—it depends altogether on the size of the face—some rails have 16, 17 & down as low as 15. When you put in 7 in. ties together & 24 in. centre it leaves your spaces pretty wide. Probably the next 3 or 4 ties may run 11, 12 or 13 ins. with a 2 ft. centre & your spaces are very narrow. Get on an engine & ride over a piece of track like that & you will find a hard spot wherever these large ties are. I am very strongly inclined to think lately that ties should be cut to a dimension, & should have a given size for the face; then there would be no difficulty & we could decide on the number of ties to put under a rail. I don't think, if ties were dimensioned say 6 by 8, that 18 ties would be any too many under a 100 lb. rail. The trimming of ballast is a thing that people differ about. I don't know that it would be policy on my part to criticize very much the standard laid down for the C.P.R., as I have charge of a division on that system; yet I have been able to find fault with & reason out a pretty strong case against this style of trimming of ballast. I contend it is detrimental to your ties in the first place, & next that if you have a good quality of gravel, with the exception of when the ground is frozen that it provides no drainage whatever. If you have a fair supply of good gravel under your track, almost every drop of rain that falls on it goes down through the gravel, it does not run over the top of it. If I saw water running over the side of the slope, as shown on this blue print, to any great extent, & no frost in the ground, I would come to the conclusion that you had not really good ballast, it was not gravel altogether, something mixed with it that the water could not get through. I have seen some other cuts of trimming of ballast on the C.P.R. & they show cinders trimmed up square with the surface of the ties, also rock ballast & coarse ballast. Of course I think it is necessary to trim dirt ballast in this way, as water will not go down through it, & if it does it will not do the road any good. I believe the ordinary tamarack or hemlock tie will last at least a year longer with the ballast up flush with the surface of the tie. I have taken hemlock ties out of farm & other crossings that had been in there 11 years & perfectly sound, only cut down with the rail. The reason was that they were protected with a covering. We don't pretend to be able to bury them all up like that, but if you leave 2½ ins. or so of the end bare you expose it & before it is rotten it begins to shake to pieces. I believe in trimming up ballast flush with the ties if you have good ballast.

T. HICKEY.—I would like to say a word with regard to the placing of ties. If we allow a given number of ties to a certain length of rail I don't see how you are going to get that number of ties if you are going to space between the ties, that is, if you get some hewn ties & some sawn ties & go to work & space them uniformly between the ties, then I cannot understand how you are going to get a certain number of ties under the rail. Our practice in placing ties is this: We allow a certain number of ties to the rail for certain sections, & we have a 15 foot pole marked for the different sections of rail. The pole is marked at intervals for the centre of each tie, & when a man wants to put in a tie or more the pole is laid on the rail with the end of it up to the end of the rail & he marks where the tie is to go in according to the mark on the pole. The old tie comes out. It is possible that you would have to shift another tie to get this one in, but he will get that tie in *where it belongs*. And when the other ties

are renewed they are all spaced uniformly. Where there are a number of large ties & some small ones the large ones are not all put in together, neither are the small ones put in together. If a man puts in a large tie he usually puts in a small one next to it & that divides up the space more uniformly. If they are all sawn ties it is not necessary to do that. The question of handling ties is really very important. The ties perhaps cost more than the rail does, & for that reason I don't think that too much care or attention can be given to the handling of them & the best method in which to space them, as a result of which they would give better service.

THE EDITOR OF THE RAILWAY AND SHIPPING WORLD.—This report gives the C.P.R. standard ballast section on tangent, as used on the Ontario & Quebec, Atlantic & Eastern division, & I thought it might interest the members to see the standards of some of the other roads. I have here the Michigan Central double track, the Intercolonial & the western division of the C.P.R., & place them at the disposal of the members.

J. DRINKWATER.—I did not intend to say that we always put 3 or 4 small ties together & 3 or 4 large ones. It is something I never do when we can avoid it. But I have seen where they were taking out & renewing ties that there was a tie probably with 12 or 13 ins. face that had to come out, & the largest tie within a mile of it did not have more than 9 ins. & you had to put it in. I have spaced ties from the centres ever since I have been in the railway service. I never spaced them any other way until this year. I said, I think, in my former remarks that in spacing between the ties, the surface bearing of the ties, that we got for some rails 17, 16 & down as low as 15, according to the size of the ties. I did not say we could put

any specified number of ties under a rail & have them equally spaced unless the ties were cut to a dimension. That is what I intend to convey to you as being my opinion of the matter. I have always spaced ties & put

them in just as Mr. Hickey spoke of. I did not always use a pole, but I have used a pole & we have a pole on every section. Even then you don't get your bearing equalized. It is utterly impossible to equalize your bearing by putting ties under the rail either by a given number or spacing them from the centre or even between the ties. It cannot be done unless your ties are all the same size.

The report was adopted.

ELECTION OF OFFICERS.

At the afternoon session officers were elected as follows:—President, J. Graham, C.A.R., Ottawa; Vice-President, R. Shanks, C.P.R., Mattawa, Ont.; Secretary-Treasurer, J. Drinkwater, C.P.R., Winchester, Ont.; Executive Committee, J. Yeo, I.C.R., Riviere du Loup, Que.; J. R. Brennan, O. & G.R., Ottawa; A. N. McLennan, S. & L.R., Glace Bay, N.S.; F. J. Holloway, C.P.R., Toronto. The minutes of last year's meeting were adopted.

RAIL JOINTS.

The committee, J. Drinkwater & W. Shanks, reported last year as follows, the discussion on the report being adjourned until this year: In connection with our work there is no one thing of so much importance or that affects tracks so much as the joints. Considering from this fact the importance of the subject & the amount of money, time & study that has been expended on attempting to perfect rail joints, & yet your committee are strongly of the opinion that the best that has been produced that they have had practical experience with is still lacking, or has failed to fully meet the requirements. Our experience is from the old wrought iron chair to the plain fish plate with the tie directly under the joint. Then came the 2-tie angle bar, & later the 6 hole 40 ins. angle bar supported with 3 ties, & later still the 44 ins. angle bar supported the same as the 40 ins. with 3 ties, & at present we have a 4 hole angle bar supported on 2 ties.

Our experience has been that wherever joints have been supported with a tie directly under them, whether with the plain fish plate or the 3 tie 6 hole angle bar, the results have been better than with the 4 hole angle bar with the joint suspended between ties. The new angle bar with 4 bolts & 2 ties suspended joint is, we consider, a decided improvement over the old one in its general make up. Instead of slats in the edges for spikes the holes are through the web or flange. This gives the full benefit of the 4 spikes against spreading, but with the improvements in this joint over the old 2 tie suspended joints we have been unable to see where the defect has been remedied, or the cause removed, or the necessity provided for that we have found to exist with a suspended joint.

The 40 & 44 ins. angle bars have the appearance of a waste of material & this, of course, means expense for which no benefit is derived.

Up to the present our experience is, & we beg to report based on experience, that the suspended joint has been a failure & even with the improvements on the present suspended joint we do not feel free to recommend it as being all that it should be, but, to the contrary, believe that they must get their support from underneath & we consider that the energy spent & the efforts put forth to produce a satisfactory joint have not been productive of the result desired.

The report having been read, it was decided to postpone its further discussion.

SUBJECTS FOR NEXT YEAR.

THE CHAIRMAN.—The meeting is now open for discussion as to the subjects for our next annual meeting. It will be necessary to couple with the suggestion of each subject the names for the committee.

The following subjects were selected:—The

