

1/16 of an inch of scale will increase the fuel consumed on a locomotive 15 per cent. This is no doubt true if all the heating surfaces were completely covered and the scale composed largely of sulphate of lime or magnesia. On roads that follow up their boiler washing very closely, it may be high. It is not possible to do much effective washing between flues on modern engines. Crown sheets and side sheets are kept much cleaner than formerly. I would hesitate to say the average fuel waste is as high as 15 per cent in and around St. Louis. I will say, however, that untreated city water at St. Louis will produce heavy, hard scale in a year and will cause unnecessary fuel consumption. I know of one road operating a number of switch engines around Kansas City that had very serious trouble for steam on switch engines that had been in service a year and found it very difficult to remove flues on account of the heavy scale. This road had a hot water wash-out plant and always had 125 pounds wash-out pressure and paid strict attention to proper washing. It was absolutely impossible to wash the scale off the flues.

The Chemical Treatment

If such water as we have will make scale and waste fuel, the obvious thing to do is to make it non-scaling by chemical means. If the water is uniformly and consistently treated with enough soda ash to change all the calcium and magnesium sulphates into the carbonates and enough more soda ash is used to provide a slight alkalinity, the scale forming salts will precipitate as a soft sludge that can easily be washed out or kept down to a minimum, low enough to prevent mud burning by use of the blow-off cock. I know of railroads that treat all of their water with soda ash and find it very easy to run engines 150,000 miles without resetting the flues. On my own road, in districts where 12 months was considered good service for a set of flues, we are now getting three years and more with bigger engines and do not know what leaking flues are.

A roundhouse foreman told me last week that his boilermaker had worked four flues during the previous month. Engines handled from mountain type passenger engines to 28,000 tractive effort saturated engines. There was a time on this division that boiler-makers and boilerwork came before anything else. There is nearly always a string tied to every good thing. The string in this case is the increased foaming tendency of the water, caused by the addition of the soda ash. What then is the solution of the foaming difficulty? The answer is systematic use of the blow-off cock. For every pound of soda ash used 1 1/3 pounds of sulphate of soda is produced in the water. Inasmuch as the steam used is pure water and cannot take any of the dissolved or suspended solids with it through the

cylinders, the natural and added alkali or foaming salts remain behind and accumulate in the boiler. If they are allowed to build up until they reach a concentration of 250 parts per 100,000 or in other words 18 1/2 pounds per 1,000 gallons, the boiler will foam. The thing to do is to prevent accumulation to the foaming point by removing some of the bad water from the boiler and replacing it with fresh water from the tank. Unless the treatment is very heavy, it is cheaper to do this through the blow-off cock than to wash the boiler. If the blow-off cock is located where circulation is the slowest, a great deal of the accumulated sludge will be removed incidental to blowing the boiler enough to prevent foaming.

2,160 Mile Test

We recently ran a test on a mountain type passenger engine between Oklahoma City and St. Louis; made a total of 2,160 miles without wash-out or water change and without the least signs of foaming. At the end of the test, roundhouse foreman submitted a report showing 3/4 of an inch soft mud on the mud ring when the plugs were removed to wash the boiler and make inspection.

The boiler and blow off cocks were calibrated and the amount blown off per minute determined. No special instructions were issued to enginemen other than to specify number of minutes the blow off cock was to be held open between passenger engine terminals and to suggest the amount of blowing off should be spread fairly evenly over the sub-division. It was

necessary to do more blowing off between Springfield and Oklahoma City than between Springfield and St. Louis.

The first trip total dissolved solids in the boiler reached 195 parts per one hundred thousand at Springfield. The dissolved solids did not again reach this point until arrival at Springfield on third trip, when they were 204 parts per one hundred thousand; the engine arrived at Oklahoma City at the end of the test with the dissolved solids at 155 parts per one hundred thousand.

A few of the outstanding features of the test are as follows:

No. 9 on the fourth trip was 1 hour and 20 minutes late out of St. Louis, passed Marshfield 30 minutes late; fuel performance .96 gallons per passenger car mile, dissolved solids in the boiler leaving St. Louis 147 parts per one hundred thousand, dissolved solids upon arrival at Springfield 152 parts per one hundred thousand. This shows very plainly that boiler can be kept in good condition by using the blow off cock even though operating conditions are unusually severe. There was no difficulty in finding opportunity or time to blow the boiler.

One trip on No. 10 fuel performance was down to .57 gallons per passenger car mile.

The total water consumption was 220,700 gallons of which 11.7 per cent was blown out. The fuel consumption was 19,000 gallons of which 4.5 per cent was blown out. The following table gives some of the essential details of the four trips:

Train and Date	From To	Water Factors		Blow-off Cock		Dissolved Solids in Boiler. Parts per 100,000
		Gals. Used	% Blown Out	Open Min.	Sec.	
No. 10 3-15	Oklahoma City Springfield	31,522	10.2	12	3	25.2 195.2
No. 10 3-16	Springfield St. Louis	24,170	11.0	10	0	195.2 155.6
No. 9 3-16	St. Louis Springfield	25,102	10.5	10	0	111.2 128.4
No. 9 3-17	Springfield Oklahoma City	29,181	11.7	12	55	128.4 184.0
No. 10 3-17	Oklahoma City Springfield	32,780	13.2	16	25	146.2 204.0
No. 10 3-18	Springfield St. Louis	25,398	10.5	10	9	204.0 190.4
No. 9 3-18	St. Louis Springfield	22,337	10.5	10	0	146.6 152.4
No. 9 3-20	Springfield Oklahoma City	27,206	15.1	15	20	158.0 154.8

The engine steamed freely and was perfectly lubricated during the entire test.

Figures On Treatment

The amount of blowing off varies with the quality of the raw water and the amount of treatment necessary. We have found out boilers will foam when the dissolved solids reach 250 parts per 100,000. St. Louis city water contains about 7.5 parts of natural alkali salts and requires around 10 parts of treatment. In round numbers a total of 18 parts of alkali salts have to be taken care of, so that

when 250 divided by 18 or 14 boilers of water have been used, the boiler will be in a foaming condition. It will then be necessary to either wash the boiler or blow it off. In this case 7 per cent of the water will have to be blown away. I think 6,000 gallons would be a good average water consumption for a switch engine on an eight hour shift. Seven per cent of 6,000 gallons is 420 gallons. One

(Now Turn to Page 35, please)

GOGGLES SAVE HIS EYE

Flying Steel Shatters Lens, But Leaves Roy Little His Sight

ROY LITTLE, another man of the Frisco family employed in the Reclamation Plant at Springfield, Mo., owes his eyesight to a pair of goggles which he had the forethought to put on before he attempted a piece of hazardous work.



MR. and MRS. ROY LITTLE

In anticipation of the danger to his eyes from flying steel fragments when engaged in chipping rivets, Little slipped on his goggles only a few seconds before a flying piece of steel hit the goggle and broke it squarely in the middle, but left his eye uninjured.

His earning power, for himself and Mrs. Little, who is shown in the accompanying picture with him, remains unimpaired.

This is another time the great blindness of "Eternal Night" was cheated by old King "Thoughtfulness."

WATER TREATMENT AN AID

(Continued from Page 34)

pound of coal will heat around 22 pounds of water to the temperature of the water leaving the blow off cock; therefore, 160 pounds of coal will have to be charged against the cost of treatment. If we take the average of a number of switch engines in St. Louis territory I am sure a conservative estimate of the waste due to scale without the benefit of water treatment will be 6 per cent. Remember one authority estimated one-sixteenth inch of scale wastes 15 per cent of the fuel. A switch engine using 6,000 gallons of water will burn about four tons of coal. Six per cent of four tons is 480 pounds. The difference between 480 pounds and 160 pounds is 320 pounds net saving due to clean sheets and heating surfaces. The effect of clean heating surfaces on the rapidity of transfer of heat to the water has a direct bearing on the amount of coal used per fire. The smaller the fires

A Happy and Efficient Telegraph Gang at Kelleyville, Okla.



Telegraph gang Number 85, appearing above, is one of the oldest gangs on the road in point of service. If the happy expressions are true indications of radiant good will, they are one of the happiest groups in America. The photograph was taken at Kelleyville, Oklahoma, recently. Foreman A. Oliver, (extreme right), is in the employ of the Western Union assigned to Frisco service, and is the only person in the picture not a Frisco employe.

the less possibility of smoke.

One more comparison and I will close. I stated before one pound of coal will heat 22 pounds of water to the temperature at which it leaves the blow off cock. Our engines will not make more than six pounds of water into steam at maximum boiler pressure. The difference between 22 pounds and 6 pounds is difference between the fuel loss at the blow off cock and at the pops, or putting it another way 3 2/3 times as much fuel is necessary to make one pound of water into steam at maximum boiler pressure as is required to raise the same pound of water to the boiling point at the same boiler pressure. The difference is the heat necessary to make steam out of the water that has already been heated to the boiling point.

The secret of successful water treatment is to keep the treatment full and uniform, and for the men on the engine to apply the Golden Rule. Blow your engine enough to know it is not going to foam and to know that you are turning it in at the end of the day with the boiler in good enough condition so that the man following you will not have to do your blowing as well as his own. He has every right to expect that you have done this and inasmuch as the railroad company has seen fit to treat the water it has every right to expect all of us to do our share toward obtaining the results desired.

SOUTH SHOPS MEET

Accident Prevention Noon Session Well Attended, June 4

The first of a series of noon hour accident prevention meetings was held at the Springfield South Shops, Friday, June 4, and proved very interesting and instructive.

L. J. Leysaht, superintendent of the South Shops acted as chairman, made the opening address. He displayed a pair of goggles with one lens shattered by a rivet head, and talked on the protection which the goggles provided for the employe engaged in work which called for the use of them.

A. W. Blume, general storekeeper, was also present and made a short address.

These meetings will be held frequently, and will be "testimonial" meetings. Every employe is not only invited, but urged to attend and make any suggestions which will aid in furthering the campaign of accident prevention.

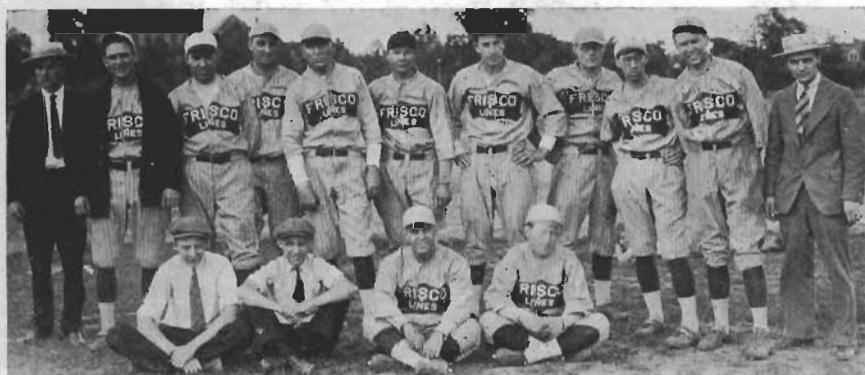
The following supervisors and employes of the South Shops made recommendations and suggestions: Cloe May, Joe Roberts, R. M. Porter, E. McMahan, Charles Stepp, Jake Fuzzell, George Hubbard, Geo. Bates, Art Stewart, Jess Mimich, William Frost, Ira Jones, Prentice Rogers and Floyd Little.

Brisban Hanks, speaking for the colored men, brought out the fact that among the forty colored men employed at these shops, there had not been an accident in the past three years.



Frisko Club of St. Louis in Second Place Manufacturers' League

*General Office Nine Has Won Four Lost Two to
June 12—Employes Invited*



The accompanying photograph shows the Frisko Ball Club of the St. Louis general office building in battle attire.

Reading from left to right: H. F. Fletcher, secretary of the Club; W. O'Neill, J. McAuliffe, Chic Ernst, Herman Busekus, L. Ahrens, M. Roseberg, M. Trefz, A. DuRacher, J. Kuworthy, George Grellner, president. Lower row: Norman Cool and Elmer Brune, bat boys, R. Sack and J. Lyons, manager.

The Club is standing well in the Manufacturers' League, having won four games and lost two, to June 12. and is tied for second place with only one-half game out of first place. The team is being strengthened each week and hopes to win the pennant in the League.

They are asking that the officials and employes attend the games every Saturday afternoon at 3:00 p. m. Full announcement is given each week by bulletin.

Frisko Club Loses Third Game of Season to Moore-Jones Team

THE Frisko Club of the St. Louis offices lost to the Moore-Jones team on June 12, 2 to 0.

Conley, making his first start of the season on the mound for the Frisko Club did well, holding the opposition to two hits and striking out four batters. Errors kept him from turning the Moore-Jones men back in 1-2-3 order in six of the nine innings.

Four of the regular Frisko players were absent which lessened the hitting strength, although the Frisko team outhit the Moore-Jones team three to one.

On June 19 the Frisko Club met the Mercantile Trust team at the Fair Grounds Park, grounds No. 2, where the Frisko team lost the game with a score of 6 to 4.

The Frisko men have been playing splendid ball, and the next few games should see them with a winning score over their opponents.

On Saturday, June 26, they met the Sunlight Factory team, which is leading in the League, however, the outcome of the game could not be determined in time for this announcement.

The Magazine wants pictures and stories of the Frisko Baseball, Track and Swimming Teams. Send them to the Editor now—before you forget.

FORT WORTH WINS TW

Sherman Falls Before Victor
Red Sox, May 31, 4-3

THE Ft. Worth and Sherman teams are playing some hard fought games as the box score below denotes.

On May 2 the Ft. Worth team defeated the Sherman team, five to four and on May 31, Ft. Worth took a game from Sherman, with a final score of 4-3.

Below is the box of the game played at Sherman on May 31, which there was a fine attendance:

		SHERMAN					
		AB	R	H	P	O	A
Reid, 3b	.....	3	1	0	1	1	1
O'Conner, ss	.....	4	0	1	0	3	0
Sistrunk, lf	.....	4	0	0	0	0	0
Estes, cf	.....	4	0	1	0	2	0
O'Connell, 2b	.....	4	0	1	2	2	0
Hendrix, c	.....	4	2	1	11	0	0
Dial, lb	.....	3	0	0	10	1	0
McCollum, rf	.....	3	0	0	1	0	0
Brown, J., p	.....	1	0	0	1	0	0
Harmon, p	.....	0	0	0	0	3	0
Campbell, p	.....	3	0	1	1	3	0
Brown, V., *	.....	1	0	0	0	0	0
Tucker, **	.....	1	0	1	0	0	0
Cherry, ***	.....	1	0	0	0	0	0
Total	.....	36	3	6	27	13	3

		FORT WORTH					
		AB	R	H	P	O	A
Lanham, 3b	.....	5	0	2	0	3	0
Richardson, lf	.....	4	0	2	0	0	1
Hughes, ss	.....	4	1	0	1	0	0
Wallis, 1b	.....	4	1	1	11	0	3
Helton, p	.....	4	1	1	0	6	0
Devaney, rf	.....	4	1	1	0	0	0
Bishop, 2b	.....	4	0	0	2	1	0
Parrot, cf	.....	4	0	1	0	0	0
Walker, c	.....	4	0	1	13	2	0
Total	.....	37	4	9	27	12	4

*—Hit for Dial in 9th
**—Hit for McCollum in 9th
***—Hit for Reid in 9th

Summary: Three base hits—Parrot. Home Runs—Hendrix, Helton. Stolen bases—Reid 2, O'Connell, Walker. Sacrifice Hits—O'Connell, Hughes. Base on balls—O'Conner, Parrot. Hit by pitcher—McCollum by Helton. Left on bases—Sherman 6, Fort Worth 5. Struck out—by Helton 13 in 9 innings; Brown 4 in 2 innings; Harmon 0 in 2 innings; Campbell 7 in 5 innings. Hits off Brown—1 in 2 innings; off Harmon 3 in 2 innings; off Campbell 5 in 5 innings. Umpires Pennell of Sherman and Williams of Fort Worth. Time of game—2 hours, 10 minutes. Scorer, J. Honaker.

THE BALL CLUB SAILS

The Frisko Baseball Club of St. Louis general offices has chartered the good ship "The J. S. Steamer De Luxe" for a moonlight ride down the Mississippi on the night of July 7.

Tickets are now on sale at \$1.00 each, and the boat leaves Washington Avenue Wharf, St. Louis, at 8:30 p. m. A record crowd of enthusiastic Frisko boosters is expected, as great interest is being taken in the affair. Every employe is urged to come, bringing the family and friends.

"FRISCO DAY" AT ST. LOUIS TRAFFIC CLUB—PRES. KURN SPEAKS

(Continued from Page 9)

should with safety stop; it does not mean the Mechanical Department to which is intrusted the great undertaking of seeing that power and cars are in safe and proper condition for service. But it does mean that the organizations as so classified must function as one great organization before that which you expect of us—A PROPER SERVICE—can be adequately provided. So that, our first duty, as I see it, is to organize efficiently—to have each and every one connected with the various classified organizations incident to the operation of our properties understand that they are a part of the great organization which embraces everything connected with transportation.

The Human Element

"In accomplishing this duty we have to deal with an element which can and always will be summarized by what the individual represents. If the individual is at fault, before his faults can be discovered the effectiveness of the machine might be involved. So that our first duty is to a complete and thorough understanding of the individual, and then to work to the end of a functioning of individuals represented by departments, and when this is accomplished—and I say it is more nearly 100 per cent effective today than it ever was in the history of railroads—we, as officers of the railroads, have performed a duty which inures to the benefit of the user of our transportation as well as to ourselves and our stockholders.

Thanks for Co-operation

"And then, as we see it, our duty might be considered broadly and embrace all those who are engaged in the handling of traffic. That does not necessarily mean the railroad representative or the railroad employe alone, but it would, to my way of thinking, very properly include such as many of you are—the industrial traffic managers of great concerns who have a great and almost controlling interest in seeing that that which you offer for transportation is properly tendered.

"I would not go into the realm of tariff intricacies, but I do thank you for the hundred per cent co-operation which you have tendered to the railroad operators in the handling of the traffic which you have to offer, and I hope that this co-operation will continue, because it is very essential, as I view it, to a proper rendition of the service insofar as we are concerned. Therefore, I can very properly say that it is not only my duty, but it is your duty to see that there shall be a continuation of the almost perfect co-operation which exists as between industry and transportation today.

"Our duty, as I view it, is to work to the end of building up industry. Very properly you might say, and I subscribe thereto, that this is a very selfish motive on our part. Naturally it is, because such activity means a creation of tonnage. But in the development of industry the part that we seek to offer in turn has to be met with a co-operation upon the part of those who are ready to offer capital and energy for a furtherance of the production of tonnage. I believe that there is a great field for us all in a more complete survey of a further industrial activity which spells for increased productivity, building up of communities, improving farm or rural conditions, working out marketing problems, using without offense the intensities which we might command for the purpose of solving the problems incident to the production of products of the field of the forest, or the mines.

"And when we properly go into undertakings of this kind there is another form of co-operation which I feel is well worthy of our consideration, and that is the co-operation of organizations such as represented by the Chambers of Commerce of the various cities and towns as served by railroads, with the industrial or development organizations of the railroads. I believe it is our duty to, in a sense, subordinate persons to things. So often it is the case that we see that the operations of great affairs bring men to the surface. That is but natural, and it is but natural that men who have made a success in great affairs must suffer somewhat at the hands of too much publicity; so that a possible duty is to try and work to the end of pushing that which spells for increased productivity rather than the individual who may be responsible therefor, and insofar as I have gone, it has been my effort to try and work to that end.

"Oftentimes I think that we have a mistaken idea as to our duty; and the railroads possibly are responsible for certain conditions which I think might well be righted. Oftentimes months before, we see in the columns of the press prognostications as to crop conditions. This publicity is in many instances commendable and proper, but I feel that it is our duty to be more than sure as to the possible results from our prognostications, because it has been my observation that many a market condition adverse to our own productions has been created by the unwarranted form of publicity which seasonal adversities have shattered. I have seen the price of one of our principal commodities of the field—wheat—influenced adversely as a result of unwarranted figures as to probable yields; and I am not so certain but what some figures as to the products of horticulture—strawberries, etc.—have been the means of creating impressions which have resulted in a possible threatened glut of markets, all to the disadvantage of

the producer. We, as I see it, have a duty, and we are within the realm of the proper conduct of our affairs when we definitely determine as a result of proper surveys as to what, in our opinion, might be the yields of the various products of the field or forest or mine, and then take steps to prepare for the transportation of the incoming crops. This surely is a proper activity; but when we go beyond this and advertise to the world, we are probably dealing with the rights of others, and until and unless we have the approval of the co-operative organizations who have the marketing or handling of these products within their control, we should refrain, as I see it, from an undue activity bordering on notoriety which might be used to the disadvantage of those who have worked to the end of a proper productive accomplishment.

A Proper Regard

"It is our duty to inspire a proper regard for each other. It is our duty to have a proper understanding of our own. It is our duty to try within reason to know just what might be working to the advantage or disadvantage of everyone who is connected with our great organizations. This is a tremendous undertaking, but it is our duty to keep in touch with every unit who is a part of our great machine and to see that they have been given a proper consideration, because a kindly administrative ruling can, in my opinion, create an effective operation. Of course, don't get me wrong when I say that there is probably no other form of productivity that requires as much care in the administration of discipline as in the productivity of transportation.

"The subject is so interesting that I would like to spend much more time than I can reasonably appropriate, but I thank you for the privilege of being with you. I hope that we can carry out what I have previously expressed as my view—a greater co-operative assistance in your undertakings than we have in the past."

AUXILIARY OF B. OF L. E. MEETS IN ST. LOUIS

Three hundred delegates from ten states attended the Missouri Union Meeting of the G. I. A. to the Brotherhood of Locomotive Engineers, which was held at the Hotel Coronado, St. Louis, May 13 and 14. The G. I. A. members were entertained by the five St. Louis divisions. The program included a drive over St. Louis the afternoon of May 13, and a banquet in the ballroom of the Coronado that evening. The day of May 14 was given over to business meetings.

Texas Lines Employes Join in Mam



The four hundred Texas Lines employes photographed in the two accompanying pictures had almost "cleared" of what Texas Lines employes called "the greatest out-door meal ever served" may be seen on the picnic table at

Note lad in upper picture, second row, near right, with "Frisco" on his baseball suit. He is Billie Burton, son of O. H. McCarty, V. P. & G. S.; E. F. Tuck, general roundhouse foreman; Jas. Grace, trainmaster; K. P. Guin, storekeeper.

On Billie's right (reader's left): J. W. Surles, master mechanic; W. A. Morgan, general car foreman; L. C. [unclear], and J. T. Odell, road foreman of equipment. Billie's father, L. L. Burton, is standing just behind Mr. Surles.

